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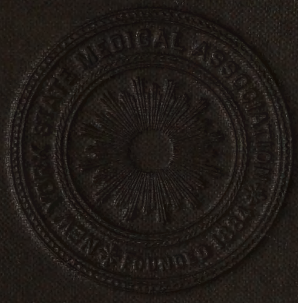

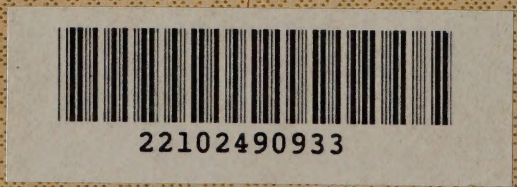
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OF

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FOR THE YEAR 1891.

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BY E. D. FERGUSON, M. D.,

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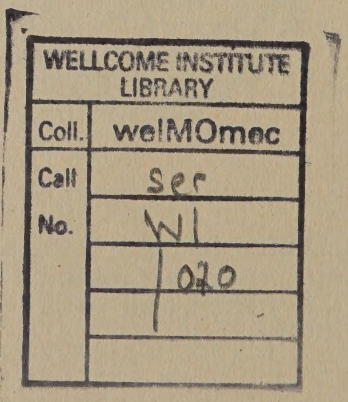

BRITISH MEDICAL ASSOCIATION Library

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OFFICERS AND COUNCIL FOR 1890–'91.

PRESIDENT.

STEPHEN SMITH, M. D., New York County, Fifth District.

VICE-PRESIDENTS.

FIRST DISTRICT, DOUGLAS AYRES, M. D., Montgomery County.
SECOND DISTRICT, A. T. VAN VRANKEN, M. D., Albany County.
THIRD DISTRICT, J. D. TRIPP, M. D., Cayuga County.
FOURTH DISTRICT, ROBERT J. MENZIE, M. D., Livingston County.

SECRETARY (and Acting Treasurer).

E. D. FERGUSON, M. D., Rensselaer County.

DIRECTOR OF THE LIBRARY.

J. W. S. GOULEY, M. D., New York City.

MEMBER OF THE COUNCIL AT LARGE.

S. B. WYLIE McLEOD, M. D., New York County.

ELECTED MEMBERS OF THE COUNCIL.

FIRST DISTRICT, W. D. GARLOCK, M. D., Herkimer County.
" " WM. H. BIGGAM, JR., M. D., Montgomery County.
SECOND DISTRICT, J. B. HARVIE, M. D., Rensselaer County.
" " THOMAS WILSON, M. D., Columbia County.
THIRD DISTRICT, GEORGE DOUGLAS, M. D., Chenango County.
" " H. O. JEWETT, M. D., Cortland County.
FOURTH DISTRICT, THOS. D. STRONG, M. D., Chautauqua County.
" " S. T. CLARK, M. D., Niagara County.
FIFTH DISTRICT, A. L. CARROLL, M. D., New York County.
" " JOHN G. TRUAX, M. D., New York County.

COMMITTEE OF ARRANGEMENTS FOR 1890–'91.

STEPHEN SMITH, PRESIDENT.
E. D. FERGURON, SECRETARY.
Ex-officio Members of the Committee.

JOHN G. TRUAX, *Chairman.*
CHARLES E. DENISON, *Secretary.*

E. S. F. ARNOLD,
GLOVER C. ARNOLD,
F. A. BALDWIN,
ALFRED L. CARROLL,
ELLERY DENISON,
A. PALMER DUDLEY,
JOHN F. ERDMANN,
THOMAS W. P. FLINN,
JOHN W. S. GOULEY,
GEORGE T. HARRISON.
CHARLES A. LEALE,
JAMES C. MACKENZIE,
WILLIAM McCOLLOM,
JOHN P. McGOWAN,
S. B. WYLIE McLEOD,
VALENTTINE MOTT,
A. D. RUGGLES,
JOHN SHRADY,
E. H. SQUIBB,

OFFICERS AND COUNCIL FOR 1891–'92.

The Ninth Annual Meeting will be held at the Mott Memorial Library, in New York City, beginning Tuesday, 15 November, 1892.

PRESIDENT.

JUDSON B. ANDREWS, M. D., Buffalo, Erie County.

VICE-PRESIDENTS.

FIRST DISTRICT, W. D. GARLOCK, M. D.,
Little Falls, Herkimer County.
SECOND DISTRICT, GEORGE E. McDONALD, M. D.,
Schenectady, Schenectady County.
THIRD DISTRICT, LEROY J. BROOKS, M. D.,
Norwich, Chenango County.
FIFTH DISTRICT, HENRY VAN HOEVENBERG, M. D.,
Kingston, Ulster County.

SECRETARY (and Acting Treasurer).

E. D. FERGUSON, M. D., Troy, Rensselaer County.

CHAIRMAN OF THE LIBRARY COMMITTEE.

J. W. S. GOULEY, M. D., 324 Madison Ave.,
New York, New York County.

MEMBER OF THE COUNCIL AT LARGE.

WILLIAM McCOLLOM, M. D., Brooklyn, Kings County.

ELECTED MEMBERS OF THE COUNCIL.

FIRST DISTRICT, E. T. RULISON, M. D.,
Amsterdam, Montgomery County; term expires 1893.
" " JOHN P. SHARER, M. D.,
Little Falls, Herkimer County; term expires 1892.

SECOND DISTRICT, THOMAS WILSON, M. D.,
Claverack, Columbia County; term expires 1893.
" " J. B. HARVIE, M. D.,
Troy, Rensselaer County; term expires 1892.
THIRD DISTRICT, H. O. JEWETT, M. D.,
Cortland, Cortland County; term expires 1893.
" " GEORGE DOUGLAS, M. D.,
Oxford, Chenango County; term expires 1892.
FOURTH DISTRICT, S. T. CLARK, M. D.,
Lockport, Niagara County; term expires 1893.
" " THOMAS D. STRONG, M. D.,
Westfield, Chautauqua County; term expires 1892.
FIFTH DISTRICT, JOHN G. TRUAX, M. D.,
17 E. 127th St., New York, New York County; term expires 1893.
" DISTRICT, A. L. CARROLL, M. D.,
30 W. 59th St., New York, New York County; term expires 1892.

OFFICERS OF THE BRANCH ASSOCIATIONS FOR 1892.

FIRST OR NORTHERN BRANCH.

The Eighth Annual Meeting will be held as appointed by the President and Secretary.

Officers.

President, W. D. GARLOCK, M. D.,
Little Falls, Herkimer County.
Secretary, EZRA GRAVES, M. D.,
Amsterdam, Montgomery County.

Executive Committee.

WILLIAM GILLIS, M. D., Fort Covington, Franklin County.
ISAAC de ZOUCHE, M. D., Gloversville, Fulton County.
THOMAS McGANN, M. D., Wells, Hamilton County.
W. D. GARLOCK, M. D., Little Falls, Herkimer County.
J. MORTIMER CRAWE, M. D., Watertown, Jefferson County.
ALBERT A. JOSLIN, M. D., Martinsburg, Lewis County.
H. M. LEACH, M. D., Glen, Montgomery County.
G. ALDER BLUMER, M. D., Utica, Oneida County.
E. F. MARSH, M. D., Fulton, Oswego County.
GUY RUEBEN COOK, M. D., Louisville, St. Lawrence County.

SECOND OR EASTERN BRANCH.

The Eighth Annual Meeting will be held at Schenectady, Schenectady County, on the fourth Thursday in June, 1892.

Officers.

President, GEORGE E. McDONALD, M. D.,
Schenectady, Schenectady County.
Secretary, C. H. BURBECK, M. D., Troy, Rensselaer County.

Executive Committee.

W. B. SABIN, M. D., West Troy, Albany County.
E. M. LYON, M. D., Plattsburgh, Clinton County.
T. F. WOODWORTH, M. D., Kinderhook, Columbia County.
LYMAN BARTON, M. D., Willsborough, Essex County.
ROBERT SELDEN, M. D. Catskill, Greene County.

J. P. MARSH, M. D., Troy, Rensselaer County.
I. G. JOHNSON, M. D., Greenfield Centre, Saratoga County.
H. C. VAN ZANDT, M. D., Schenectady, Schenectady County.
WILLIAM HAGADORN, M. D., Gilboa, Schoharie County.
G. R. MARTINE, M. D., Glens Falls, Warren County.
A. J. LONG, M. D., Whitehall, Washington County.

THIRD OR CENTRAL BRANCH.

The Eighth Annual Meeting will be held at Owego, Tioga County, on the third Thursday in June, 1892.

Officers.

President, LEROY J. BROOKS, M. D., Norwich, Chenango County.
Secretary, W. S. AYER, M. D., Owego, Tioga County.

Executive Committee.

J. H. CHITTENDON, M. D., Binghamton, Broome County.
J. D. TRIPP, M. D., Auburn, Cayuga County.
T. A. WALES, M. D., Elmira, Chemung County.
H. C. LYMAN, M. D., Sherburne, Chenango County.
F. W. HIGGINS, M. D., Cortland, Cortland County.
W. B. MORROW, M. D., Walton, Delaware County.
. . . . . Madison County.
H. D. DIDAMA, M. D., Syracuse, Onondaga County.
B. A. CHURCH, M. D., Oneonta, Otsego County.
B. T. SMELZER, M. D., Havana, Schuyler County.
ELIAS LESTER, M. D., Seneca Falls, Seneca County.
W. L. AYER, M. D., Owego, Tioga County.
WILLIAM FITCH, M. D., Dryden, Tompkins County.

FOURTH OR WESTERN BRANCH.

The Eighth Annual Meeting will be held at Buffalo, Erie County, on the second Tuesday in May, 1892.

Officers.

President, JUDSON B. ANDREWS, M. D., Buffalo, Erie County.
Secretary, WM. H. THORNTON, M. D.,
570 Niagara St., Buffalo, Erie County.

Executive Committee.

J. A. STEPHENSON, M. D., Scio, Alleghany County.
S. J. MUDGE, M. D., Olean, Cattaraugus County.
NELSON G. RICHMOND, M. D., Fredonia, Chautauqua County.
H. D. INGRAHAM, M. D., Buffalo, Erie County.
M. W. TOWNSEND, M. D., Bergen, Genesee County.
F. H. MEYER, M. D., Moscow, Livingston County.
R. M. MOORE, M. D., Rochester, Monroe County.
S. T. CLARK, M. D., Lockport, Niagara County.
F. D. VANDERHOOF, M. D., Phelps, Ontario County.
JOHN H. TAYLOR, M. D., Holley, Orleans County.
JEREMIAH DUNN, M. D., Bath, Steuben County.
DARWIN COLVIN, M. D., Clyde, Wayne County.
A. G. ELLINWOOD, M. D., Attica, Wyoming County.
WILLIAM OLIVER, M. D., Penn Yan, Yates County.

FIFTH OR SOUTHERN BRANCH.

The Eighth Annual Meeting will be held in Brooklyn, Kings County, on the fourth Tuesday in May, 1892.

Officers.

President, H. VAN HOEVENBERG, M. D.,
Kingston, Ulster County.
Secretary, E. H. SQUIBB, M. D.,
P. O. Box 94, Brooklyn, Kings County.

Executive Committee.

I. D. Le ROY, M. D., Pleasant Valley, Dutchess County.
W. G. RUSSELL, M. D., Brooklyn, Kings County.
W. T. WHITE, M. D., New York, New York County.
M. C. CONNER, M. D., Middletown, Orange County.
G. W. MURDOCK, M. D., Cold Spring, Putnam County.
E. G. RAVE, M. D., Hicksville, Queens County.
F. U. JOHNSTON, M. D.. New Brighton, Richmond County.
WILLIAM GOVAN, M. D., Stony Point, Rockland County.
W. D. WOODEND, M. D., Huntington, Suffolk County.
C. W. PIPER, M. D., Wurtsborough, Sullivan County.
H. VAN HOEVENBERG, M. D., Kingston, Ulster County.
R. B. COUTANT, M. D., Tarrytown, Westchester County.

LIST OF PRESIDENTS AND VICE-PRESIDENTS FROM THE FOUNDING OF THE ASSOCIATION.

1884.

PRESIDENT.

HENRY D. DIDAMA, M. D., Onondaga County, Third District.

VICE-PRESIDENTS.

FIRST DISTRICT, J. MORTIMER CRAWE, M. D., Jefferson County.
SECOND DISTRICT, TABOR B. REYNOLDS, M. D., Saratoga County.
FOURTH DISTRICT, B. L. HOVEY, M. D., Monroe County.
FIFTH DISTRICT, NATH'L C. HUSTED, M. D., Westchester County.

1885.

PRESIDENT.

*JOHN P. GRAY, M. D., Oneida County, First District.

VICE-PRESIDENTS.

SECOND DISTRICT, WILLIAM H. ROBB, M. D., Montgomery County.
THIRD DISTRICT, JOHN G. ORTON, M. D., Broome County.
FOURTH DISTRICT, JOSEPH C. GREENE, M. D.. Erie County.
FIFTH DISTRICT, *JOSEPH C. HUTCHINSON, M. D., Kings County.

1886.

PRESIDENT.

E. M. MOORE, M. D., Monroe County, Fourth District.

*Deceased.

VICE-PRESIDENTS.

FIRST DISTRICT, WILLIAM GILLIS, M. D., Franklin County.
SECOND DISTRICT, H. C. VAN ZANDT, M. D., Schenectady County.
THIRD DISTRICT, *FREDERICK HYDE, M. D., Cortland County.
FIFTH DISTRICT, J. G. PORTEOUS, M. D., Dutchess County.

1887.

PRESIDENT.

*ISAAC E. TAYLOR, M. D., New York County, Fifth District.

VICE-PRESIDENTS.

FIRST DISTRICT, JOHN P. SHARER, M. D., Herkimer County.
SECOND DISTRICT, L. C. DODGE, M. D., Clinton County.
THIRD DISTRICT, *GEORGE W. AVERY, M. D., Chenango County.
FOURTH DISTRICT, DARWIN COLVIN, M. D., Wayne County.

1888.

PRESIDENT.

JOHN CRONYN, M. D., Erie County, Fourth District.

VICE-PRESIDENTS.

FIRST DISTRICT, BYRON DE WITT, M. D., Oswego County.
SECOND DISTRICT, ROBERT SELDEN, M. D., Greene County.
THIRD DISTRICT, CHARLES W. BROWN, M. D., Chemung County.
FIFTH DISTRICT, EDWIN BARNES, M. D., Dutchess County.

1889.

PRESIDENT.

WILLIAM T. LUSK, M. D., New York County, Fifth District.

VICE-PRESIDENTS.

FIRST DISTRICT, S. H. FRENCH, M. D., Montgomery County.
SECOND DISTRICT, R. C. McEWEN, M. D., Saratoga County.
THIRD DISTRICT, ELIAS LESTER, M. D., Seneca County.
FOURTH DISTRICT, THOMAS D. STRONG, M. D., Chautauqua County.

*Deceased.

1890.

PRESIDENT.

JOHN G. ORTON, M. D., Broome County, Third District.

VICE-PRESIDENTS.

FIRST DISTRICT, DOUGLAS AYRES, M. D., Montgomery County.
SECOND DISTRICT, M. H. BURTON, M. D., Rensselaer County.
FOURTH DISTRICT, E. M. MOORE, JR., M. D., Monroe County.
FIFTH DISTRICT, WILLIAM McCOLLOM (Vice WILLIAM B. EAGER, deceased), Kings County.

1891.

PRESIDENT.

STEPHEN SMITH, M. D., New York County, Fifth District.

VICE-PRESIDENTS.

FIRST DISTRICT, DOUGLAS AYRES, M. D., Montgomery County.
SECOND DISTRICT, A. T. VAN VRANKEN, M. D., Albany County.
THIRD DISTRICT, J. D. TRIPP, M. D., Cayuga County.
FOURTH DISTRICT, ROBERT J. MENZIE, M. D., Livingston County.

LIST OF FELLOWS REGISTERED AT THE EIGHTH ANNUAL MEETING IN NEW YORK CITY.

Held October 28, 29, and 30, 1891.

FIRST DISTRICT.

HERKIMER COUNTY.

Garlock, William D., Little Falls.
Sharer, John P., Little Falls.

MONTGOMERY COUNTY.

Ayres, Douglas, Fort Plain.
Johnson, Richard G., Amsterdam.
Robb, William H., Amsterdam.
Rulison, Elbert T., Amsterdam.

ONEIDA COUNTY.

Blumer, G. Alder, Utica.
Brush, Edward N. (Baltimore Md.).
Dodge, Amos P., Oneida Castle.

OSWEGO COUNTY.

Todd, J. B., Parish.

SECOND DISTRICT.

CLINTON COUNTY.

Lyon, E. M., Plattsburgh.

COLUMBIA COUNTY.

Bradley, O. Howard, Hudson.
Smith, H. Lyle, Hudson.
Wilson, Thomas, Claverack.

GREENE COUNTY.

Selden, O. G., Catskill.
Selden, Robert, Catskill.

RENSSELAER COUNTY.

Burbeck, Charles H., Troy.
Burton, Matthew H., Troy.
Cooper, William C., Troy.
Ferguson, E. D., Troy.
Finder, William, Troy.
Harvie, John B., Troy.
Houston, David W., Troy.
Lyon, George E., Troy.
Marsh, James P., Troy.

SARATOGA COUNTY.

Moriarta, D. C., Saratoga Springs.

SCHENECTADY COUNTY.

Hammer, Charles, Schenectady. Van Zandt, Henry C., Schenectady.
McDougall, R. A., Duanesburgh.

THIRD DISTRICT.

BROOME COUNTY.

Greene, Clarke W., Chenango Forks. Pierce, Edward A., Binghamton.
Orton, John T., Binghamton.

CAYUGA COUNTY.

Tripp, John D., Auburn.

CHEMUNG COUNTY.

Brown,Chas.W.(Washington,D.C.). Squire, Charles L., Elmira.

CHENANGO COUNTY.

Douglas, George, Oxford. Lyman, H. C., Sherburne.

CORTLAND COUNTY.

Higgins, F. W., Cortland. Jewett, Homer O., Cortland.

MADISON COUNTY.

Cavana, Martin, Oneida.

ONONDAGA COUNTY.

Didama, Henry D., Syracuse. Head, Adelbert D., Syracuse.

OTSEGO COUNTY.

Leaning, John K., Cooperstown.

TIOGA COUNTY.

Ayer, W. L., Owego.

FOURTH DISTRICT.

CATTARAUGUS COUNTY.

Mudge, Selden J., Olean.

CHAUTAUQUA COUNTY.

Bemus, Morris M., Jamestown. Strong, Thomas D., Westfield.

ERIE COUNTY.

Andrews, Judson B., Buffalo.
Bartlett, Frederick W., Buffalo.
Cronyn, John, Buffalo.
Fell, George E., Buffalo.
Hubbell, Alvin A., Buffalo.
Lapp, Henry, Clarence.
McFarlane, W. A., Springville.
Thornton, William H., Buffalo.

GENESEE COUNTY.

Townsend, Morris W., Bergen.

LIVINGSTON COUNTY.

Jones, George H., Fowlerville.

MONROE COUNTY.

Moore, Edward M., Rochester.

NIAGARA COUNTY.

Clark, Simeon T., Lockport.

STEUBEN COUNTY.

Gilbert, Horatio, Hornellsville.
Jamison, John S., Hornellsville.

WAYNE COUNTY.

Colvin, Darwin, Clyde.
Landon, Newell E., Newark.

WYOMING COUNTY.

Lusk, Zera J., Warsaw.

FIFTH DISTRICT.

DUTCHESS COUNTY.

Barnes, Edwin, Pleasant Plains.
Bayley, Guy Carleton, Poughkeepsie.
Leroy, Irving D., Pleasant Valley.
Porteous, James G., Poughkeepsie.
Pultz, Monroe T., Stanfordville.

KINGS COUNTY.

Bell, A. Nelson, Brooklyn.
Bierworth, Julius C., Brooklyn.
Biggam, William H., Brooklyn.
Leighton, Nathaniel W., Brooklyn.
Lloyd, T. Mortimer, Brooklyn.
McCollom, William, Brooklyn.
Minard, E. J. Chapin, Brooklyn.
North, Nelson L., Brooklyn.
Russell, William G., Brooklyn.
Squibb, Edward H., Brooklyn.
Steinke, Carl O. Hermann, Brooklyn.
Sullivan, John D., Brooklyn.
Van der Veer, J. R., Brooklyn.
Wieber, George, Brooklyn.

NEW YORK COUNTY.

Arnold, Glover C., New York.
Baldwin, F. A., New York.
Bryant, Joseph D., New York.
Bull, Charles Stedman, New York.
Carroll, Alfred Ludlow, New York.
Chrystie, Thomas M. L., New York.
Curry, Walker, New York.
Davis, J. Griffith, New York.
Davis, Robert C., New York.
Denison, C. Ellery, New York.
Denison, Ellery, New York.
de Quesada, Gregorio, New York.
Dudley, A. Palmer, New York.
Eliot, Ellsworth, New York.
Erdmann, John F., New York.
Flinn, Thomas W. P., New York.
Flint, William H., New York.
Fogg, John S., New York.
Furmann, Guido, New York.
Gouley, John W. S., New York.
Harrison, George T., New York.
Holmes, Martha C., New York.
Hubbard, Samuel T., New York.
Janeway, Edward G., New York.
Leale, Charles A., New York.
Lewis, Robert, New York.
Ludlow, Ogden C., New York.
Lukens, Anna, New York.
Lynch, Patrick J., New York.
MacGregor, James R., New York.
MacKenzie, J. C., New York.
McGillicuddy, T. C., New York.
McLeod, Johnston, New York.
McLeod, S. B. Wylie, New York.
McLochlin, James A., New York.
Manley, Thomas H., New York.
Milliken, S. E., New York.
Mitchell, Hubbard W., New York.
Mott, Valentine, New York.
Murray, Sanford J., New York.
Newman, Robert, New York.
Pritchard, R. L., New York.
Purple, Samuel S., New York.
Ruggles, Augustus D., New York.
Shrady, John, New York.
Shunk, Albert, New York.
Silver, Henry M., New York.
Smith, J. Lewis, New York.
Smith, Stephen, New York.
Truax, J. G., New York.
Wallach, Joseph G., New York.
White, William T., New York.
Wyeth, John A., New York.

PUTNAM COUNTY.

Putnam, George W., Cold Spring.

RICHMOND COUNTY.

Johnston, Francis U., New Brighton.

ROCKLAND COUNTY.

Govan, William, Stony Point.

SUFFOLK COUNTY.

Hamill, Edward H.

ULSTER COUNTY.

Chambers, Jacob, Kingston. Van Hoevenberg, Henry, Kingston.

WESTCHESTER COUNTY.

Acker, Thomas J., Croton Landing. Husted, N. C., Tarrytown-on-Hudson.
Granger, William D., Bronxville. Wells, William L., New Rochelle.

SUMMARY BY DISTRICTS OF FELLOWS IN ATTENDANCE.

First District,	10
Second District,	19
Third District,	15
Fourth District,	20
Fifth District,	82
Total,	146

DELEGATES FROM OTHER MEDICAL ORGANISATIONS AND INVITED GUESTS IN ATTENDANCE.

Connecticut.

CHARLES D. ALTON, M. D., Hartford, . . Delegate.
LOREN F. DAY, M. D., Westport, ... Delegate.
ARCHIBALD DOUGLAS, M. D., New London, . Invited Guest.

Illinois.

NICHOLAS SENN, M. D., Chicago, ... Invited Guest.

Maryland.

HENRY M. HURD, M. D., Baltimore, . . . Invited Guest.

New Jersey.

B. A. WATSON, M. D., Jersey City, . . . Invited Guest.

Rhode Island.

J. H. DAVENPORT, M. D., Providence, . . Delegate.
J. HOWARD MORGAN, M. D., Westerly, . . Invited Guest.

CORRESPONDING FELLOWS.

HENRY O. MARCY, M. D., Boston, Mass.

ADDRESS OF WELCOME, AND REPORT OF THE COMMITTEE OF ARRANGEMENTS.

By J. G. Truax, M. D., of New York County, Chairman of the Committee.

Gentlemen: It is with a great deal of pleasure, that I, as chairman of your Committee of Arrangements, extend to you this morning a hearty greeting. One can but feel great respect for those of you who year after year make the journey to this city to attend these meetings. It is not made except with great sacrifice on your part of your business interests; besides, it is a tax upon your strength.

Looking at it from another point of view, it is a source of satisfaction to your Committee of Arrangements, for if there were not provided for you a programme which contained matter of sufficient value to pay you for this trouble, your visits to our city for the purpose of attending these meetings would cease. At no time since I have been a member of the Council of this Association has there been a better programme provided than this for the eighth annual meeting. That it may prove interesting and instructive to you all, is the wish of your Committee of Arrangements.

Departing a little from the usual custom, we would like to suggest that some subjects be considered at this meeting which are not down on the programme. The first and most important is the forming of associations in each county, which shall be in sympathy with the State Association. The next is the changing of our by-laws so that membership in one association will carry with it membership in the other. Another important matter for us to attend to is, to give to the senators and the assemblymen information on such medical matters as are likely to come before them when in the discharge of their duty at Albany. This can only be

done with effect by each member of this Association giving it his personal attention, and having personal interviews with his senator and assemblyman.

There is a law on the statute books of this state which prohibits a man who has received a medical education from being appointed president of the board of health of New York city. Looking at it from any stand-point and in any light, it seems to the writer to be not only a direct insult to our profession, but a wrong to the people of this city. No other civilized state or nation on the face of this globe would have for the president of its board of health any other than a man who had received such an education. Is it not in our power to see that this law is changed?

There are to be four addresses,—one by the President, Stephen Smith, M. D., of New York county; one on Surgery, by Nicholas Senn, M. D., of Illinois; one by A. Palmer Dudley, M. D., of New York county; and one by the Rev. William C. Bitting, D. D., of New York county.

The discussions will be upon the following two subjects: First, Acute Diffuse Peritonitis, which will be opened by A. L. Carroll, M. D., of New York county; second, Causation of Insanity, which discussion will be opened by Judson B. Andrews, M. D., of Erie county. A reference to the programme will give you any information you may desire in connection with the discussion of each subject.

Altogether there are thirty-three subjects, to be considered by sixty-one speakers. These contributions come from the five districts of the state, and from sister states, in the following proportions:

The First District	5
Second "	3
Third "	3
Fourth "	9
Fifth "	31
State of Michigan	2
State of Maryland	2
State of Massachusetts	1

State of New Jersey	1
State of Pennsylvania	1
State of Illinois	1
District of Columbia	1
	61

In the five districts, Fellows of the Association from thirteen counties contribute essays in the following proportions:

First District,	Montgomery	county		2
" "	Herkimer	"		1
" "	Oneida	"		1
Second "	St. Lawrence	"		1
" "	Rensselaer	"		2
" "	Schenectady	"		1
Third "	Onondaga	"		1
" "	Cortland	"		1
" "	Chenango	"		1
Fourth "	Erie	"		8
" "	Niagara	"		1
Fifth "	New York	"		29
" "	Kings	"		1
" "	Westchester	"		1

To present these contributions properly to your attention much time is required, more even than your committee has provided. At one time it was thought that the session would have to be prolonged another day; but if no time be lost, and the discussions be confined to the ten minutes allowed to each person, your committee are of the opinion that two evening sessions in addition to the regular morning and afternoon sessions will be sufficient. The morning sessions will be opened at 9 a. m., the afternoon sessions at 1 p. m., and the evening sessions at 7:30 p. m. Two papers have been received since the distribution of the official programme.

PRESIDENT'S ANNUAL ADDRESS.

THE ART OF TEACHING MEDICINE.

By Stephen Smith, M. D., of New York County.

October 28, 1891.

The Father of Medicine has been represented to us, by an eloquent writer, in the attitude of a teacher. He says,— "Near a column of the temple, and holding a roll of papyrus in his left hand, stands Hippocrates. Gathered about him, in picturesque little groups, there is a company of Greek youths. Their tasteful and elegant costumes, their earnest and intelligent faces, and their general air and bearing, all show plainly enough the superior refinement and culture of the class to which they belong. They are medical students, who have assembled here from the several states of Greece to acquire the clinical skill and experience of the great surgeon and physician of Cos."

It is not difficult to determine the method of instruction pursued in the school of Cos. Hippocrates was the contemporary of Socrates and Plato, and doubtless adopted the plan of teaching so popular at that period. "The method of instruction which Socrates chiefly made use of," says his biographer, "was to propose a series of questions to the person with whom he conversed, in order to lead him to some unforeseen conclusion. He first gained the assent of his respondent to some obvious truths, and then obliged him to admit others, in consequence of their relation or resemblance to those to which he had already assented. Without making use of any direct argument or persuasion, he chose to lead the person he meant to instruct to deduce the truths, of which he wished to convince him, as a necessary consequence

from his own concessions. He commonly conducted these conferences with such address as to conceal his design, till the respondent had advanced too far to recede. On some occasions he made use of ironical language, that vain men might be caught in their own replies, and he compelled them to confess their ignorance. He never assumed the air of a morose and rigid preceptor, but communicated useful instruction with all the ease and pleasantry of polite conversation."

From this description of the method of instruction by the philosophers of that day, we can readily understand the art of teaching in the school of Cos. The temple was that of Æsculapius, and here the sick congregated for treatment, and here were kept the votive tablets, or records of sickness of all who had sought medical advice within its precincts. With these patients who daily visited the temple, and the vast collection of records as materials for study, the professor gathered his class about him and proposed a series of questions to each student; having gained his assent to some obvious truths, he would oblige him to admit others related to, or resembling, those to which he had already assented. In this manner he led the person whom he was instructing to deduce the truths, of which he wished to convince him, as a consequence of his own concessions. He disciplined certain students, always found in the class, who, owing to their conceit, were very forward and often impertinent, by the use of ironical language, by which they were caught in their replies and compelled to acknowledge their ignorance. This teaching was all done in a most familiar way, with the ease and pleasantry of polite conversation, and not with the morose and rigid air of a preceptor.

Such was the art of teaching medicine at this early period, and we now recognise it among the lost arts. The principle which underlies it is this: There must be such a familiar relation between the teacher and the pupil that the latter is constantly under the immediate and personal superintendence of the former, and instruction is given by mental questioning

and answering. Bacon quaintly, but very truly, remarks, "He that questioneth much shall learn much." This simple axiom embodies the whole art of teaching and of learning. In a scheme of education based on this principle, the student is not a passive agent who simply receives what is offered him. On the contrary, he is active and aggressive; he is inquisitive, but thoughtful; he is receptive, but only of demonstrated facts. Every step of progress in his studies is taken with precision, and no necessary questions are left unanswered. The student thus trained lays broad and deep the foundations that will insure future success. He will not, for he cannot, be indolent. Habituated to inquire, his mind will never be at rest. If ambitious, he will despise mediocrity, and will attain to distinction in whatever field he is placed.

In nearly every department of education but medicine, the system of instruction is based on the above axiom. The student is placed in a position of constant questioning and being questioned. From the rudiments of each science to its most abstruse problems, he has the attitude of an inquirer. The text-books which he studies are little else than questions. The instructor is constantly inviting questions, and answering or explaining doubtful points. The prevailing systems of education require personal contact, as between teacher and pupil. Every feature of the school is subservient to the one great purpose of facilitating questioning and answering on the part of the student. To that end the building is planned, the furniture selected, the apparatus supplied, the books chosen, and the teachers employed. The student is the unit in this system, and every condition must subserve his interests.

Far different is our system of medical education. The student no longer studies. He "reads" medicine. Two thirds of the year he idles away his time reading works which have not the slightest adaptation to his wants. He is alone, and hence he asks no questions. There is little in the books to stimulate a solitary student to inquiry. During the remainder of the year he attends lectures in a medical school,

where his individuality is completely lost. There is no classification of students according to their grade of advancement, but all stand on the same footing, and listen to the same lectures. In this common and miscellaneous gathering the student sinks into insignificance, while the professor becomes the most prominent feature of the school. All the appointments of the college are designed to increase his importance, and to facilitate the discharge of his duties as a lecturer. At each lecture the entire body of students assemble; the professor enters with due formality, and delivers himself in an oracular manner; he retires, not to be seen again until the next lecture. Sometimes the professor asks a few general questions before his lecture, which one or two of the class always promptly answer. But the remaining students are dumb in the presence of their teacher, and open not their mouths. Occasionally a student of the inquisitive, Baconian type follows the professor to his private quarters, and plies him with questions, but he soon learns that his inquiries are not agreeable, and he ceases to enjoy this small privilege. The professor is the unit of interest in this school.

These considerations suggest the question, Should not our system of medical education be placed on the same basis as that which gives so much value to other branches of study? In other words, Should not the medical course of instruction be graded, and the medical student be required to pass through these several grades under the immediate instruction and direction of a competent teacher? We give an emphatic answer in the affirmative. By no other method can justice be done to the student in the present enlarged and exact state of the medical sciences. The primary branches,—anatomy, chemistry, and physiology,—cannot be more adequately taught by lectures, than mathematics, Latin, or Greek. And the same is true of the practical branches, medicine, surgery, and obstetrics. The method of teaching these latter subjects by lectures alone, is best illustrated by the homely saw about learning to swim without going into the water, or becoming a navigator without seeing a ship.

Nor should our present methods of giving clinical instruction by lectures be excepted from the general condemnation. The student may gain some useful hints from the coarser operations in surgery, and from the exhibition of a few cases of the gross forms of external disease. But how meagre the amount of practical knowledge gained, compared with what he would have acquired had he been brought into personal contact with the subject, and been required to use his own eyes, ears, nose, and fingers under the immediate guidance of a skilful instructor! And how much the amount and value of that knowledge would have been enhanced if he had had the privilege of questioning and being questioned in reference to every doubtful point in his investigation! If the case were one of disease of the heart or lungs, in which the diagnosis depended upon an accurate appreciation of a sound, of what immense importance to the student are the immediate and familiar promptings of a teacher!

Perhaps at the commencement of the present century, when the medical sciences were comparatively in their infancy and largely theoretical, teaching by lectures may have been adequate. We have, indeed, a remarkable illustration of this fact in the early history of Dartmouth Medical College. For twelve years Dr. Nathan Smith was the Faculty, and gave all the lectures on all the branches then taught, being at once Professor of Anatomy, Surgery, Chemistry, and the Theory and Practice of Medicine. But what a vast development of the medical sciences has been made during the century! Not only have they been enlarged far beyond the comprehension of the earlier teachers, but they have been perfected in details until many of them may be classed with the exact sciences, while all are complete in terminology and classification. Even the practical branches are becoming less and less theoretical and speculative, as investigation by improved means and apparatus daily adds new facts and determines doubtful questions.

Medicine having therefore assumed the rank and character of the technical sciences, should be taught by the method

approved by the best educators. This method has as its basis the gradation of subjects, from the rudiments of the science to its most complex forms; classification of students according to their advancement in the course of study; an organisation of classes so that every student thoroughly reviews each subject under the immediate supervision of a competent instructor; ample means of illustrating every subject, and of enabling the student personally to learn by practical demonstrations and experiments; the preparation of text-books adapted to this method of instruction.

It is not difficult to outline a medical school which would realise the ideal contemplated in the foregoing sketch. First, the school should be so located as to have all the necessary conditions for anatomical, chemical, physiological, and clinical demonstration and research; this building should be so constructed that there would be an ample supply of class-rooms, each being adapted to the particular branch taught in it. Thus, the anatomical room or rooms should have all necessary facilities for dissection; the chemical and physiological rooms equipped for every form of experiment required; the rooms for the practical branches and clinical instruction adapted for their special purposes; a department arranged for post-graduate courses of study; finally, a hall for lectures to the general class or to special classes.

Second, a faculty should be selected, composed of one professor for each general branch taught. Each member of the faculty should be the highest authority in his branch obtainable. This faculty should be the governing body, having as duties the supervision of the teaching, the selection of instructors, the final examination of students for graduation, and the delivery of such lectures as may be deemed necessary to supplement the direct instruction of the tutors.

Third, a corps of instructors selected for their known qualifications to teach the branches to which they are assigned.

Fourth, a division of the students into sections or classes, not to exceed twenty-five in each; the division being based upon a grading of the students according to their proficiency

or advancement in each branch of study; to each section an instructor should be assigned who will be immediately responsible to the professor for the thorough training of each member of his class.

The practical operations of the school might be on the following plan: The term should comprise the year with a short summer vacation, in order that the student may be in continuous training under his instructor. The recitations should be at such intervals as will secure time for preparation. At the recitation each student should receive such an examination as will satisfy his instructor that he thoroughly understands every point in it. Such recitations should be devoted to acquiring exact technical knowledge, and practical demonstrations by the student, under the immediate supervision of his teacher, of every subject which admits of illustration by experiment or any form of manipulation. If the subject is the anatomy of the skeleton, the pupil should demonstrate, with the bones in his hands, each feature of the lesson; if the soft parts are under review, he should show his knowledge by dissection; if the lesson is in chemistry or physiology, he should prove every proposition by experiment; if the studies are clinical, he should personally examine the patient in every detail necessary to a correct diagnosis, and subsequently follow the case to its termination. Whenever a student in any branch appears to the instructor to be thoroughly qualified, he should be examined critically by the professor of that branch or science, and if found qualified, should be duly certified by the professor, and advanced to the next grade of study. Thus he proceeds until he completes the curriculum prescribed, when he receives a final examination by the faculty, and, if qualified, graduates.

In a school organised and managed in the manner described, time may be eliminated as an element to be considered in graduation. Educational qualification alone should determine that question. In such a school, also, the better students can be advanced more rapidly than others less apt in learning, by suitable classification.

Nor are lectures precluded as an element of instruction. On the contrary, lectures by the professors on certain subjects, especially in the practical and clinical parts of the course, would be useful, and hence desirable. With the adoption of this system of teaching would follow the necessity of the preparation of a series of text-books. Scarcely a work now in the hands of students has that systematic arrangement and treatment of subjects which would adapt it to a completely graded course of medical instruction. Our works on anatomy, physiology, chemistry, and the practical branches are deficient in that orderly development of the sciences which they are designed to teach, and in that clear and precise statement of facts, and logical deductions on which their conclusions are based, which the student requires.

This discussion suggests the practical question, Can existing medical schools adopt and successfully manage this scheme of instruction? There would seem to be no feature in the plan which it would prove difficult to realise. Buildings could readily be adapted to teaching by recitations; instructors may be obtained, of the highest order of qualification, in unlimited numbers; each department can be equipped with every necessary appliance for demonstration, experimentation, and illustration; and, finally, suitable text-books would, as in the academic schools, soon be amply supplied. But we are not left to conjecture as to the practicability of at once reforming our system of medical education on the basis now proposed. Already one of our largest metropolitan medical schools has adopted the method of instruction by recitations, in what may be called the primary branches, and with gratifying success. Several other medical colleges in different parts of the country have also in whole, or in part, adopted this system with equally good results. These are gratifying indications of a revival of the ancient Art of Teaching Medicine.

THE USE OF CHLOROFORM IN LABOUR.

By E. T. Rulison, M. D., of Montgomery County.

October 28, 1891.

The victim of any disease or accident requiring a surgical operation is given an anaesthetic, without even a request being made for it, to enable him to pass through the ordeal without pain. The dreaded surgical operation is thus deprived of its greatest terror, and the patient awakes with a happy feeling of relief and with a minimum amount of shock. This being admitted without debate, why are the great majority of our lying-in patients allowed to endure the pain of childbirth without the hand of science being extended to them in relief? As a rule, the woman in labour is allowed to endure the most excruciating pain to the bitter end without one effort being made to alleviate her sufferings. And why? Simply because tradition, handed down by one old woman to another, says it is wrong, and, in fact, wicked, to interfere with the laws of nature. To this specious kind of reasoning we have all listened, and have, perhaps, too often allowed ourselves to remain inactive. How many of us insist upon using chloroform in all cases not contra-indicated? In nearly every case of confinement you will find some who are prejudiced against its use, because they know nothing whatever about it. When its use is offered and opposition is met with, the physician is too apt to shrug his shoulders and imagine he is relieving himself of all responsibility by simply saying, "Do just as you like." When he does this he is shirking an imperative duty, just the same as the surgeon would that neglected to administer an anaesthetic when about to do a capital operation. The patient and assistants must be properly educated to its use, and oftentimes the nurse will bear a little educational work before she will act in full sym-

pathy with the attending physician. Notwithstanding the ignorance existing concerning its use, the principal reason for its not being more generally employed is due to the fact that physicians are timid in using chloroform, and they usually do so by clumsily employing a handkerchief as an inhaler. By this mode of administration, either the physician must attend to it himself or it must be intrusted to some one competent to do so, and even then its use is attended by no little risk, as fatal narcosis may follow a temporary suspension of vigilance. As a result, the use of chloroform is generally unsatisfactory, and it is not given with that confidence which inspires its constant and continued use. Several years ago I came across one of Dr. Battershall's inhalers, and at once the idea occurred to me that it was just what I wanted to use in my confinement cases. It is so constructed that not a drop of the anaesthetic is lost. The reservoir is cylindrical in shape, and so arranged with valves, openings, etc., that the anaesthetic can be easily given in large or small quantities, as desired. During the first stage of labour, the inhaler is so regulated that a small amount of chloroform is used, just enough to make the patient comfortable but not sufficient to produce full anaesthesia. The inhaler being elongated in form and weighing over nineteen ounces, makes it unnecessary for any one to attend to the anaesthetic except the patient herself. As soon as unconsciousness approaches, the inhaler drops from the face and consciousness of pain gradually returns, when it is reapplied. When the head is well down on the perinaeum, and only a few pains are necessary to complete the delivery, some one is directed to keep the hood of the inhaler to the face until the head is delivered, when the anaesthetic is withdrawn and not given again unless some complication should be discovered requiring its use.

By the proper administration of chloroform in labour the following results are sure to be attained:

1. No severe pain; hence no nervous shock; consequently the " inevitable chill " does not appear.

2. It reduces the number of perinaeal tears to a minimum.

3. It shortens labour, and in several ways greatly relieves the attendants.

4. Childbirth being robbed of its chief terror, the tendency to resort to criminal practices is reduced, and population consequently increased.

5. It brings increased respect for the medical attendant. The gratefulness depicted upon the countenance of the woman when informed by her attendant that she is a mother (having become so without pain) cannot fail to arouse in him thoughts so pleasing that he is apt to forget, for a moment, that a doctor has any trials.

DISCUSSION.

Dr. Ogden C. Ludlow, of New York county, said that he was pleased to hear the author advocate the more general use of chloroform during labour. The profession seemed to be divided into two classes, representing extremes of practice,—the one class avoiding its use, and the other employing it in almost every case. Personally, he was in favour of using chloroform at some period or another in almost every case of labour, but this statement presupposed a careful and judicious method of administering it. The anaesthesia should be pushed only to the point where it will blunt pain and give sufficient relaxation of the parts. He was not familiar with the particular form of inhaler described in the paper, but the mode of administration which he was accustomed to employ, which was by no means original with him, had given him such good results, that, as it is not very generally known, it is perhaps worthy of mention. It consists of an ordinary tumbler, into which absorbent cotton, or a small handkerchief, is packed tightly. If it does not readily remain in the tumbler, this difficulty can be obviated by previously dampening the cotton or handkerchief. It is simple, and can readily be obtained at any time, and by its use the degree of anaesthesia can be very accurately gauged. Ordinarily, the accoucheur holds the tumbler before the patient's face with one hand during the acme of a pain, while the other hand is free for any manipulations that may be deemed necessary. As soon as the pain has subsided the tumbler is removed, and placed mouth downward on the bed, thus preventing the evaporation of the chloroform, and leaving the inhaler ready for instant use when the next pain occurs. Where it becomes necessary for the nurse to administer the chloroform, it is much safer to employ the tumbler than the usual folded towel, for the latter is very liable to drop down unnoticed against the patient's face, and so prevent that free access of air which is necessary for the

safe administration of this anaesthetic. By employing the anaesthetic in the manner just described, many perinaeal lacerations are prevented, and the patient saved, as the author has said, from undue shock. He had carefully studied a considerable number of hospital cases, and had come to the conclusion that when used in this way chloroform is safer in obstetric practice than ether, except in cases of prolonged and severe operations, as the greater control which it gives over delivery more than counterbalances any possible dangers inherent in the anaesthetic agent itself. He had observed only one drawback to its use, and that is a rather more free bloody oozing after the delivery of the placenta than is common in normal cases of labour where no anaesthetic has been employed. This oozing has never been serious, and only necessitated keeping the obstetrician's watchful hand upon the uterus for a longer time, in order to be certain that the alternating contractions and relaxations of the uterus have given place to firm tonic contraction.

Dr. M. W. Townsend, of Genesee county, said that the subject was one of the greatest importance. Anything like a free administration of an anaesthetic during labour almost invariably gives rise to more than the usual amount of haemorrhage,and often to very severe post-partum haemorrhage. He doubted very much whether he had any right to interfere with normal labour any more than with the usual variation of temperature in disease. To give every parturient woman an anaesthetic for the purpose of relieving pain, he considered meddlesome midwifery. He had been struck with the frequency with which both ether and chloroform were given in such a way as to produce partial asphyxia. Every so called inhaler produced asphyxia, and consequently he had been in the habit of administering anaesthetics on one thin layer of cloth carefully held away from the nose. It was a wasteful way, but he thought it was the only safe way. When using chloroform in cases of midwifery, it was his custom to require the patient to count aloud slowly, and the moment she ceased counting the anaesthetic was withdrawn. His experience with both chloroform and ether extended over a period of forty years, and from it he had learned that the only safe way was to give the anaesthetic slowly and with all the air possible.

Dr. S. J. Murray, of New York county, said that he never used chloroform in his obstetric practice, and while he believed in using ether in very many cases, he did not wish to be understood as advocating its use in all cases. It is not necessary to waste the anaesthetic agent, and an inhaler was convenient, but fresh air should be admitted occasionally whether the anaesthetic be chloroform or ether. In a normal case of labour where there was but little suffering, an anaesthetic was not essential.

Dr. GEORGE DOUGLAS, of Chenango county, did not consider it necessary thoroughly to anaesthetise the patient, and the skilful administrator can keep the patient sufficiently anaesthetised for all surgical purposes without bringing about full anaesthesia. *Pure* chloroform was the better and more ready anaesthetic.

PREVENTIVE MEDICINE.

By H. C. Van Zandt, M. D., of Schenectady County.

October 28, 1891.

In casting about for a subject upon which to ventilate my ignorance and bore the members present at this meeting, I have looked through the indexes of our Transactions to see what themes had already been exhausted, and found that we had all been wondrously silent upon the position and claims, present and prospective, of preventive medicine, or, rather, of sanitary science as a preventive to medicine.

Whether we are all so busy with the cure of present ills that we have no time or disposition to give consideration to the prevention of future ones; or whether we look upon sanitation as a kind of hostile innovation, seeking to take away our occupation, and hence do not care to discuss publicly its merits; or whether the most of us think there is not enough of it to discuss,—I know not.

Preventive medicine sounds like a contradiction in terms, but it expresses an idea in a terse way. By it we really mean what the medical profession are doing to prevent disease; and this again sounds like a contradiction in action. That the medical profession should take the lead, and that by a long way, in endeavouring to annihilate that upon which its work depends, and thus, like Othello, find its occupation gone, is indeed unique. But it thereby evinces the strongest proof of being a science—worthily so called—and true to the humanitarian principles it professes.

Preventive medicine is not all contradictions. The rapid strides of advancement of late years have mostly been in this direction, and the field for future work and advance is along these same lines,—and all in the direction of prevention rather than cure. It has been said that the germ theory of disease

and all that is contingent to it, all the knowledge we have of it, and all that has been said or done, has not aided us much towards curing our patients. All very true, and rationally so, because the legitimate outcome of all this research and labour is not towards cure, but prevention first, and cure as a side or secondary issue.

To prevent all we can, and cure all we cannot prevent, is hereafter to be the watchword of our profession. It may have always been tacitly so, but now it must be openly and avowedly so. To my mind there has been one great obstacle to the popularity of our profession, namely, its silentness upon matters professional. The old cry, that the people cannot understand and will get wrong impressions, etc., is a mistake and a delusion. The less they know the further wrong they get. The profession is learned, the people are ignorant, in medical matters. Ignorance is, and always has been, the stronghold of quackery. The profession, instead of instructing the people, have cloaked their knowledge, and an ignorant people have naturally enough taken to those "isms" or forms of quackery which, truthfully or otherwise, have seemed to lay bare most fully their schemes, and offer the most instruction, no matter how absurd it might be.

But in this, the preventive, phase of medicine we can no longer cloak our knowledge: we must send it broadcast: for preventive medicine, if it ever accomplishes anything, must have the intelligent coöperation of the people, and, in order to make that coöperation intelligent, we must instruct them. Hence this phase of medical work will bring the profession and the people much nearer together than they have ever been before. It will act and react to mutual good. It will give the people a much clearer, and consequently a much more correct, estimate of the medical world. For how, for instance, will "similia similibus curantur" reflect in the light of the germ theory of disease?

Just think of a Christian scientist killing microbes by a stroke of thought, or by the power of the will; or of an eclectic bombarding micrococci with globules of podophyllin; or

the hydropath drowning the poor bacilli by packing the patient in a wet sheet!

Preventive medicine will prevent many things not called by the name of disease, and further investigation in this direction is destined to lift the profession out of the charlatanism of which it was born, and placed it upon a foundation of science and certainty.

The time is fast approaching when the people will demand of the medical profession the means and methods of prevention and protection from preventible disease, as surely as they now demand the means of cure of the results of infractions of natural law.

We know that a vast majority of diseases are but the penalties nature demands for some violations of her laws, and not the dire visitations of Divine vengeance, as was formerly supposed. Who can doubt but that the destroying angel of the Egyptians would nowadays be known by the modern name of cholera infantum, and that the plagues of Egypt were but the result of the filth and squalor of their mode of living. Their Hebrew neighbours escaped both because they had some regard to sanitary laws, and, captives though they were, refused to despoil themselves with the abominations of their royal rulers.

Be this as it may, it is certain that the sanitary rules given his people by Moses, the first sanitarian of whom we have history, contain the body and soul of all the sanitary codes which have since been devised for the relief of mankind from preventible disease. Recall, for instance, his order that all excrement must be removed from the camp every day; that all soiled articles of clothing should be destroyed; that their purifying should be such and so often, and especially that they wash before they eat; that all lepers and other cases of contagious disease should be set apart, kept apart from the people, and that all who came in contact with them should remain in quarantine a certain time before they mingled again with the people,—all of which the people were careful to follow,—and you can readily see a cause for the

Jewish centenarians, and their wonderful exemption from the scourges which decimated other nations. After the dispersion of the Jews, sanitation became a lost art, and the respect for and the knowledge of natural laws passed away, and mankind grovelled as before.

We are told that man was formed from dirt, and it does seem as if the mass of mankind had a continued hankering after their supposed origin.

But a very healthy reaction has now set in, and the value and need of sanitation are now so thoroughly appreciated that the demands of the people far exceed the knowledge or the provisions we can offer them. Practical sanitation covers a broad field, and when fully developed will be a great power for good. It is fortunate that its power is great, for it has a huge work on hand. Those who have preceded us have bequeathed to us many good things—their accumulated knowledge and experience, and many ideas of value—but they have also left us the results of their ignorance and mistakes, and these latter reach much further than the former. Unfortunately we must largely augment their knowledge before we are in a position to at all combat the results of their ignorance.

The many unsanitary conditions and methods which they have left us will require years of patient labour to hunt out, remedy, or exterminate, and it will not be fair to expect any very large results from the present sanitary efforts until the results of these ancestral transgressions are eradicated. In fact, the lines along which sanitary efforts have shown most hopeful progress are those of educating the people out of old methods, old ruts, old ideas, old conclusions,—so old that they seem to have crystallised into axioms, and have been accepted without thought or consideration on the part of present people.

The nut which sanitarians are now trying hard to crack is shelled by these two words, compulsion and education, and the various ideas which cling around their united meaning. Whether it is better to educate first and compel afterwards,

or to compel first and educate afterwards, is the question. To educate the people up to a standard required to make them willing subjects of hygienic laws, ready to submit to restrictions on some of their supposed former rights, and to revolutionise their former ideas, is a work of time—of considerable time; and meanwhile the little germ, micrococci, bacilli, or whatever you may call them, will be claiming their victims in numbers in comparison to which the victims of the traditional jaw-bone of the ass would be but fractional.

But to attempt to compel an unquestioning obedience to laws and ordinances, the object and ends of which the people do not see or know,—to take away some of their former rights for their neighbours' good, and to insist upon the adoption of new methods, particularly when such methods involve considerable expense, and before the people plainly see the good to be accomplished,—is only to provoke an ignorant and useless opposition which would render *nil* the results of any sanitary legislation, no matter how humanitarian the intent of such legislation might be.

The medical profession must take the lead in these efforts for practical sanitation. It is through the profession that the required education of the people must come, and it is this thought which has inspired the above ramble.

In these times it not only behooves every physician to keep well posted upon all sanitary matters, but to take every opportunity to impart that knowledge to the people with whom he may come in contact. Through all the channels by which the profession reaches the people—by advice, by caution, by prescriptions, by lecture, by letters to the public press on the matters relating to public hygiene or the prevention of disease—the voice of the physician should be heard, and from his own consciousness of a knowledge of causes and effects he should speak as one having authority, warning the people of the dangers and how to shun them, showing them the utter folly and falseness of many of their old ideas, and the wisdom and usefulness of many of the new ones. The time has now passed when the whole duty of a physician consists in

prescribing for the relief of existing disease. He must take his share and responsibility in the prevention of disease which does not, but may, exist; he must set up the buoys and the lighthouses, and map out the charts to show the dangers; to teach the people how to live, that they may live and enjoy the living. The profession will ere long be held more keenly responsible for failure to prevent preventible disease than they have ever been held for failure to cure, because the prevention or non-prevention will be far more intelligently understood by the mass of mankind, and will be far more in accord with established science than ever the methods of cure were or can be. It is asserted without successful contradiction, that since the inauguration of, and through the means of, what little practical sanitation the profession already knows, the death-rates of many of the principal cities have been remarkably lowered, the ravages of epidemics have been stayed, and the average duration of human life considerably lengthened. Surely any phase of medical science which can accomplish such results while but partially understood, is worthy the earnest, active consideration of a profession whose chief aim and work is to bring about just such results, and to whose care and science the lives and health of the people are entrusted.

THE THEORIES OF RHEUMATISM.

By John Shrady, M. D., of New York County.

October 28, 1891.

The theories of the ancients regarding rheumatism were doubtless crude and devoid of complexity. They were, it may be assumed, founded upon the observation that pain was present, and that its fleeting character, demanding rest of a certain portion of the body and then another, was to be explained as being due, first, to an evil spirit, and subsequently to an inexplicable poison. There was manifest the same old fight between good and evil, light and darkness. No attempts at analysis of causes were made; at the best, only the clinical facts were taken into account. Food, or certainly some noxious agent, was received into the body which acted as a disturbing cause. What that something was remained a mystery. Therapy claimed attention solely as the antidote to the bane. This pain later on in the history of medicine demanded exorcism of the evil, and the proper remedy was to be sought for in divine revelation, and that was all. The clergy were looked to for their influence, and they gave it in all honesty and all faith. Then came charms and amulets, the remnants of which credulity may be traced to the desiccated potato worn in the pocket of to-day. Certainly the aetiology received little or no attention, for investigation was confined to very narrow limits, as medicine, like its sister sciences, was running along a plane that was exceedingly shadowy as even a possible art. It received no aid from physiology or chemistry, and thus rheumatism came to be regarded as a blood disease, and, later on, was cited by the humoral pathologists as the corner-stone of their doctrine. As an easy solution, agents with a supposed neutralising

power captivated the thinkers of the times, and formulae of incompatibles with most grotesque combinations were handed down from one generation to another. The malady being in its essential character protracted, on the one hand gave a history of many changes in treatment, and on the other much loyalty in stubborn adherence to the methods of those who were conspicuous as teachers. Every exemplar of the healing art contented himself with the simple expedient of subjugating pain chiefly by the application of external remedies along with some form of opium, the most ancient of drugs. Men of those days busied themselves but little with deduction or patient investigation, since the time moved on too briskly with its wars, and decimated too summarily with its pestilences. Mere pain without a history of fatality must be endured if it could not be cured.

Hereditary tendencies in families and races probably next attracted the attention of observers. But with very little advance in the realm of fact, there loomed up the spectral explanation of the wrath of Deity against some crime hidden and uncondonable. Still, as has been before stated, there remained the mystery, with little care for the wherefore, even down to the days of Aristotle, with his inflexible modes of proof without the embarrassment of facts. There was much opinion and many baseless conclusions, much obscurity and mystification but no progress.

Next there came the association of effect with cause, and the avoidance of exposure to the inclemencies of varying seasons and changes of temperature. Prophylaxis accordingly put in its plea for recognition, and the doctrine of latency, not yet quite heretical, began to have an influence well-nigh paramount.

All these theories wielded a somewhat fascinating but far from satisfactory force. They were rays, but not numerous enough for a focus: the spectrum was vague, and far from distinct. In fact, not until the days of alchemy were numbered, and astrology began to lose its hold upon the credulity of man, did there come anything like earnest, persistent, and

philosophical search for underlying causes. Even anatomy was a forbidden study.

Hippocrates, Galen, and others made a general use of the term rheumatism, employing it in the sense of an acrid defluxion from the brain contaminating the blood. Their application of the theory included the catarrhal affections, which Ballonius subsequently specialised into a distinct class. The somewhat faulty term becoming an entity, in verity a proper name, still holds supremacy, notwithstanding its loss of significance and precision. It is a fossil remain of an early, crude pathology, with the commendable recommendation of deficiency in hair-splitting classification.

As regards diet as a factor, there still prevails the old dogma that those who live mainly upon farinaceous food are the most liable to be non-rheumatic, but this opinion is based upon the assumption that the malady is more or less inflammatory.

But so far as investigations of the present prove anything, the reverse seems to be nearer the truth. Dr. Hadden, of this city, who has made the matter a subject of some study, holds the contrary view. He maintains that the graniverous animals are the most frequent victims, even in the case of birds, who often show calcareous formations along the line of their long bones, while the carniverous animals are remarkably exempt from any traces of what for the sake of convenience may be styled a special diathesis. The races who are subject to the exigencies of harsher climates furnish the most striking examples of his theory, as for instance the Scotch, who in their own country live mainly upon meal to the exclusion of meat, while the English, who are greater consumers of nitrogenous materials, with a liberal supply of the higher wines, are victims of gout, which belongs to a different class of affections.

There may be a grain of truth in the doctrine; but it is better, in view of the still meagre observations, to suspend judgment. In modern times, notwithstanding the attempt to connect the aetiology with the microbic theory, which

aims to sweep every disease into its net, the drift is still in the direction of an *error loci*, which acts simply as an irritant, seeking the most convenient escape from uncongenial surroundings. There is no reason why this virus need have a form, since many agents which are pernicious are formless, and disturb by displacement, on the principle of natural philosophy that no two bodies non-homogeneous can occupy the same space at the same time. The conflict for place of course produces the turmoil which is inevitable.

The literature of the subject is meagre, writers being prone to discuss only the therapy, and to advocate the efficacy of certain formulae, along with a hint or two regarding prophylaxis. Neither chemistry, nor physiology, nor even morbid anatomy sheds many rays upon the accuracy of our knowledge. Uric acid is made to play the chief rôle in causation, while the rationale of the many changes is left as mystical as ever. To be sure, we have advanced so far as to recognise the rather shadowy relationship of urea, and print a few symbols; but that is all. There have been no real additions to our stock of knowledge, no consensus of doctrine, and certainly no prospective victory, fated to end in summary extinction. Fothergill, said to be, with his bulky form, towering stature, and massive head, a striking figure even on the streets of London, himself a victim of gout and authority on rheumatism, was accustomed to say that urea was the typical excretion, and uric acid a reversion. At all events, with this introduction of the acid theory, amid all the varying interchanges of the chemistry involved, the present trend of opinion regarding the form of treatment, to wit, the alkaline, is far from irrational.

Another theory, that rheumatism is based upon inflammatory disturbances of nutrition, has now but few, if any, advocates, probably because the antiphlogistic mode of dealing with the disease, though long in vogue, proved to be so utterly futile. Against this view are pitted the unimportant tissue changes, which the rarely fatal cases have furnished. Of course the heart lesions are not included, inasmuch, as

mere sequences, they are not meant to be studied in the light of a metastasis. "Rheumatism," says Dr. Fothergill, "as a malady, is supposed to stand in a certain relationship to lactic acid. When glycogen is given off into the general circulation, it is converted back again into sugar. This sugar is broken up into lactic acid, which unites with the alkalies in the body and forms lactates. . . . Prout evolved the idea that rheumatism was connected with lactic acid, and B. W. Richardson followed up the idea by giving lactic acid to dogs, injecting it into the peritonaeum, and found endocarditis to follow. The proof is insufficient, but it is enough to give an air of probability to the hypothesis, for Balthazar Foster found acute rheumatism produced by medicinal doses of lactic acid given to diabetic patients."

As each organ of the body constituting a moving cause, one after another, is obliged to bear the opprobrium—at one time it is the liver, as just stated, at another it is the spleen with its mysterious rôle in the economy, and at still another it is the nervous system—no one of these explains all the phenomena; and while the therapy with a degree of constancy abides, the aetiology flits upon a vanishing screen.

DISCUSSION ON ACUTE DIFFUSE PERITONITIS.

QUESTION I.

WHAT DOES THE NORMAL HISTOLOGY OF THE PERITONAEUM TEACH US OF ITS PHYSIOLOGICAL PURPOSE?

QUESTION II.

DO PATHOLOGICAL AND CLINICAL CONSIDERATIONS WARRANT THE SEPARATION OF CASES OF ACUTE DIFFUSE PERITONITIS INTO DIFFERENT CLASSES, SOME INFECTIVE, OTHERS NOT SO?

QUESTION III.

WHAT PART DO MICRO-ORGANISMS, OR THE PRODUCTS OF FERMENTATION CAUSED BY THEM, PLAY IN THE PATHOGENY OF DIFFERENT FORMS OF ACUTE DIFFUSE PERITONITIS?

QUESTION IV.

WHAT ARE THE MEANS OF DIFFERENTIAL DIAGNOSIS BETWEEN VARIOUS FORMS OF ACUTE DIFFUSE PERITONITIS, AND WHAT THE PROGNOSIS IN EACH?

QUESTION V.

IN WHAT RESPECTS ARE THE THERAPEUTIC INDICATIONS IN ACUTE DIFFUSE PERITONITIS MODIFIED BY THE AETIOLOGICAL FACTORS?

(*a*) *From wounds, contusions, rupture of bladder or other viscus, or of abcess or aneurism; perforation; intussusception or strangulation; typhlitis; caries of bone; gall-stones; infection in course of lymphangitis.*

(*b*) *From fecal impaction; extension from enteritis; hepatitis, or disease of other abdominal viscera; in dysentery, or typhoid ulceration without perforation; incident to paludal or exanthematic fevers, to albuminuria, scurvy, cardiac disease, rheumatism; from exposure to cold and damp; from decomposition of intestinal contents.*

(*c*) *In women: from imprudence or exposure during menstruation; extension from pelvic peritonitis, peri-uterine cellulitis, metritis, salpingitis, ovaritis, etc.; from gonorrhoeal infection; from abortion; puerperal, extending from metritis, or by septicaemia; sequent to abdominal section.*

(*d*) *In children: from umbilical phlebitis; intussusception; worms, etc.*

REMARKS INTRODUCTORY TO THE DISCUSSION.

By Alfred L. Carroll, M. D., of New York County.

October 28, 1891.

Question I. What does the normal histology of the peritonaeum teach us of its physiological purpose?

The first question on our programme might have been not inaptly preceded by the inquiry, What is a "serous membrane"? and, simple as the query sounds, there would be diversity of opinion in the answers to it; for neither in embryological origin, in apparent physiological use, nor in reaction to morbid processes, is there correspondence between all the textures which are grouped under this generic title. The epiblastic ocular chambers and aural labyrinths still hold their places in our text-books, notwithstanding that the

normal purpose of their contained fluids is rather to maintain separation of surfaces than to relieve friction. So, too, the single-layered, non-vascular arachnoid bears a very doubtful relationship to the thoracic and abdominal membranes in either its histology, or its normal or morbid behaviour. And when we find an instructor in a prominent medical school proclaiming that "The nasal mucous membrane is a serous membrane," interrogation is paralysed, and all hope of definition is abandoned.

The similarity of the original structure of the pericardium, pleura, and peritonaeum—with its offshoot, the tunica vaginalis testis—is taught by the embryology of the pleuro-peritonaeal cavity, and confirmed by the fact that in sundry cases of arrested development two or more of these remain in inter-communication; and if in perfected evolution any differencing of such structure occur, it may be assumed to entail a difference of function. Of course, the consideration of structure here intended is not confined to the old anatomical description of a "serous membrane" as composed of a stratum of squamous cells superposed upon a "structureless basement membrane," but must include all tissues that are tributory to the purpose served.

All three of these sacs consist mainly of interwoven connective tissue bundles and elastic fibres, lined by endothelial cells, and of a "subserous" connective tissue layer of varying density, wherein are contained such blood-vessels, nerves, and lymphatics as they may respectively possess; in all, the parietal is thicker than the visceral layer, which is more or less intimately associated with the invested viscera; all are moistened by fluids, of the nature and mode of production of which the present state of our ignorance leaves us in troublous uncertainty. Once a similitude to blood-serum gave the membranes their name; later, a nearer analogy to blood-plasma was discerned; and in both instances the physical phenomena of osmosis were invoked in explanation, the synovial sacs being drafted into a separate regiment because the viscidity given to their contents by "synovine" argued a

secreting power of their endothelium—as if any living cells could refrain from modifying the character of the blood-constituents with which they have to deal; still later, it has been asserted that the osmosed or secerned fluid is identical with lymph, with the somewhat important omission of the lymph-corpuscles, and our "serous membranes" are rebaptised as lymphatic sacs.

But beyond their general conformity, each has certain peculiarities: The external surface of the pericardium and the costal aspect of the pleura are covered by a tougher fibrous lamella than is found in the parietal peritonaeum. The vascularity of the pericardium is shown, not only by normal anatomy, but by its "red velvet" appearance when acutely inflamed. The pleura, though in less degree, is well supplied with blood, especially in its pulmonary layer. Both have numerous nerve-filaments. Both seem—like the synoviae and bursae—to subserve in health principally the office of lubricating apposed surfaces in nearly constant motion.

Turning now to the peritonaeum, the first difference that strikes the eye is in its mechanical distribution. While the only noteworthy pleural fold is the ligamentum latum pulmonis, a large part of the peritonaeum is devoted to suspensory uses, or forms extravagant pouches: The ligaments of the liver, spleen, uterus; the mesenteries, the quadruplicature of the greater omentum, interposing an apron between the parietal and visceral layers, and inclosing a separate cavity of its own; these and minor foldings and pockets give an enormous extent of endothelium, the stomata of which lead in most places to a loosely-meshed connective tissue, rich in lymph-spaces and lymphatic vessels. Its blood-supply is scanty, its nerves few, and these chiefly in the omenta and mesenteries, the latter bearing the intestinal lymphatics and mesenteric glands. Many sub-serous lymphatics of the liver, especially those surrounding the gall-bladder, conduct to glands in the gastro-hepatic omentum; others, originating in the muscular coats of the hollow viscera, have been traced in the sub-peritonaeal tissue. In short, the peritonaeum offers a

far more elaborate absorbent apparatus than any other of the membranous sacs, and to this its mere lubricating office is apparently subordinate. Experiments have demonstrated the rapidity with which injected liquids are imbibed, and the possibility of maintaining nutrition by this means.

In women, an additional channel of invasion exists in the Fallopian tubes, beside the communication of the lymphatics of the broad ligament with those of the uterine body, and the increase of the latter during pregnancy.

Question II. Do pathological and clinical considerations warrant the separation of cases of acute diffuse peritonitis into different classes, some infective, others not so?

In a vast majority of cases of peritonitis the morbid process begins in the sub-peritonaeal connective tissue of the visceral layer, the virtual continuity of which, with the connective tissue stroma of the invested organs and its lymph-spaces derivative from them, offer facilities for either direct extension of common inflammation or transference of septic products, thus affording ground for a distinction between at least two classes of pathic conditions secondary to local visceral disease. But in addition to these we have cases in which the inflammation is excited by mechanical or toxic agents operating immediately upon the peritonaeum; others, wherein it takes rise from lymphangitis or general septicaemia; still others, such as those sometimes called "idiopathic," of which the pathogeny is not always discoverable. Here, again, the grouping of infective and uninfective is pathologically and clinically manifest; but we know—without knowing exactly why—that, especially in what may be termed the surgical category, a case may occasionally transfer itself from the milder to the graver sort.

The effusion in peritonitis, as in pleuritis, may be plastic, sero-fibrinous, purulent, or ichorous; and the character of it seems to depend more upon the aetic factor than upon the intensity of the inflammatory process, of the real nature of

which we know little or nothing. A mere adhesive film may be produced where vascular injection and subserous infiltration are marked; a profuse sero-fibrinous fluid may be poured out where at most an opalescence of the membrane is discernible; while in septic peritonitis, particularly in puerperae, Rokitansky first called attention to the amount of toxic, disorganised exudates with hardly perceptible reddening or vascularity.

The plastic form is oftenest seen in peritonitis by extension of aseptic inflammation from subjacent organs, or from "contusion"—which, in view of the now notorious tolerance of pretty rough handling by the peritonaeum, I am inclined to regard in most instances as nearly the same thing. The exudate may become organised into bands or more or less adherent layers of varying extent, or create papillary or dendritic roughenings of the surface; or its redundant cell elements may degenerate into pus, giving rise in some examples to a secondary infective process, in others remaining "laudable," to undergo fatty change and be absorbed, or, losing their liquid part, to be calcified.

The more abundant sero-fibrinous effusions, frequently observed in cases arising from exposure to cold and damp, from faecal impaction, from strangulated hernia, etc., may, under favourable conditions and judicious treatment, be rapidly and completely absorbed, or, as in the preceding class, may result in adhesions, or even in suppuration.

Purulent peritonitis is common from mechanical or chemical irritants, or from putrid infection; as in perforation, rupture of the urinary bladder, operation for imperforate hymen after puberty, septic or suppurative pelvic disease in women, etc., as well as from the above mentioned degeneration of more innocent exudates; and in children the proclivity to pus formation in peritonitis is greater than in after life.

I shall not advert to the still waging controversy concerning the origin of pus and other cell elements in these exudates, farther than to say that the exclusive ascription of all of them to the migration of leucocytes does not seem to me

to be sufficiently justified. The leucocytes in their origin are embryonic, connective tissue cells, proceeding apparently from the peripheral juncture of the two layers of the mesoblast. Even in mature life, according to our present uncertain doctrine, they are newly formed in the bone-marrow, spleen, and lymphatic glands, and probably in other unknown organic laboratories. All protoplasm, unhindered by a rigid limiting envelope, possesses, as far as comparative biology teaches us, amoeboid movement; and I have yet to be convinced that "wandering" connective tissue corpuscles are necessarily lost leucocytes which have strayed from a distant intra-vascular home, or that new growth of connective tissue is essentially dependent on leucocytic emigration. Although pus corpuscles are unquestionably enfeebled, we have no positive authority for declaring that they are "dead leucocytes." In the case of peritonitis, particularly, the enlargement of the endothelia, the active subdivision of their nuclei, and the appearance of multitudes of new cells in their place, are noted by careful investigators. In fine, not much accurate progress has been made since Waller, nearly half a century ago, showed the impossibility of a scientific discrimination between the leucocyte, the pus corpuscle, the "granulation cell," and, I would add, the primitive connective tissue corpuscle. It will also be noticed that I am not prepared to accept the "microbic" origin of all inflammation.

Question III. What part do micro-organisms, or the products of fermentation caused by them, play in the pathogeny of different forms of acute diffuse peritonitis?

As bio-chemistry has trodden on the heels of bacteriology, the intrinsic and immediate maleficence of particular "pathogenic" microphytes has been discussed with increasing skepticism, and we have learned that chemical products of their reaction upon an appropriate environment, or of their own decay, are the real morbific agents. Furthermore, there is reason to believe that the nature of the material on which

they act is an essential factor in the property of the product, and Vaughan's experimental research confirms the opinion entertained by several observers, that microphytes differing in form and in susceptibility to staining reagents may cause the development of poisons similar, if not identical, in effect. Beside the alkaloidal ptomaines or "toxines," proteid substances or "toxalbumins" have also been isolated and their virulence demonstrated. According to Büchner, however, very few of these products are capable of exciting suppuration, which he attributes to what he calls "bacteria-proteins," arising from the plasma of the dying or decadent microphytes themselves, and chemically resembling the vegetable caseins.

We have learned, too, that without bacterial intervention toxic compounds may be formed within the body; that leucomaines are not only producible by perverted action of the living animal cells, but result from many of the physiological processes of metabolism; that the very peptones of normal digestion are poisonous if introduced directly into the circulation; that the misbehaviour of our own tissue elements, or the defective elimination of the waste-products of their activity, may do nearly as much mischief as an exogenous bacterial virus. Diminished resistance or degradation of the cells, moreover, facilitates microbial invasion and multiplication, and converts the patient, so to speak, into a "culture-medium."

Most of the infective forms of peritonitis are probably occasioned by the products of bacterial fermentation, and these products may apparently be elaborated by various saprophytic micro-organisms. Examples are found in peritonitis from dirty, penetrating wounds, from perforation or laceration permitting the ingress of faecal or purulent matter, from entrance of decomposing material from the uterus and Fallopian tubes, from general septicaemia, etc. But there are cases presenting somewhat similar phenomena which are perhaps attributable to endosomatic poisons, generated or accumulated in the disordered tissues. In intussusception or strangulation of any kind, in severe bruising without exter-

nal wound or laceration, where circulatory disturbance leads to perversion of nutrition or to molecular necrosis, the conditions exist for incidental noxious synthesis.

The intense and rapidly diffused inflammation excited in numerous instances by intra-peritonaeal effusion of urine from rupture of the bladder through its serous investment, is not easily to be classified. On the one hand, normal urine, unexposed to air, is aseptic; on the other, none of its ordinary ingredients is known to be violently irritant; in fact, it is the ancient mariner's favourite collyrium for conjunctivitis. Even if the conversion of its urea into ammonium carbonate were chemically imaginable in these circumstances, the latter salt, in much stronger solution than is possible in urine, has been tested upon animals by intravenous injection and otherwise, with only the temporary manifestation of its tetanising influence. There is some evidence that urine may be absorbed by the peritonaeum, and more that its prolonged presence in the serous sac does not always induce inflammation. Whether a septic ferment is imported, or a proteid or leucomainal poison concerned in such cases, is a problem for future bio-chemistry to solve.

Question IV. What are the means of differential diagnosis between various forms of acute diffuse peritonitis; and what the prognosis in each?

If we discard the too long misused adjective "idiopathic," as applied to peritonitis, it is evident that diagnostic inquiry must often take a wide range to discover the originating disorder; and in some instances,—such as those arising from incarceration, non-perforative implication in typhoid fever, nephritis, etc.,—the prognosis depends rather on the primary disease than on the peritonaeal involvement. Even where peritonitis, per se, constitutes the principal peril to life, prognosis—as in other pathic conditions—is a variable term, changing with every advance of therapeutic art.

It is scarcely needful, in addressing an audience of experi-

enced physicians, to remark that the early diagnosis of peritonitis is not always as facile as some writers represent it. Initial rigour and rapid rise of temperature are frequently absent, and when they do occur, are commonest in cases caused by septicaemia, or by exposure to cold—cases with totally opposite prognosis. Indeed, there are instances in which the whole course of the disease is nearly or quite afebrile, and others wherein the temperature may be subnormal. The pain and tenderness, ordinarily so characteristic, may, in rare examples, be trifling, as if the peritonaeum retained its natural insensitiveness despite the inflammatory provocation. Nausea and vomiting are seldom inceptive symptoms, and may exist in other disorders—as in enteritis or intestinal occlusion—which are among the not infrequent causes of peritonitis; and constipation falls in the same category. Tympanites is an indication that inflammation and infiltration have already made much progress, and, in muscular patients, may not appear until near the end. Fluctuation is only discoverable where an abundant liquid exudation has taken place. Oliguria and dysuria are neither peculiar to peritonitis, nor are they so marked in this when exudation is slight and vomiting scanty or absent. An expert diagnostician may now and then find himself with little more than the physiognomy and decubitus of the patient to guide his first opinion. Granting that such cases are exceptional, it is nevertheless important to bear in mind their existence.

Still more difficult is it sometimes to determine when diffuse peritonitis supervenes upon preëxisting maladies or traumatism, where the symptoms of the primary lesion simulate or mask those of the secondary affection. As a rule (with not a few exceptions), the marked increase and unremitting character of pain, the change from restlessness to immobility and relaxation of the abdominal muscles, the rise of temperature, the quickening of the pulse, and the onset of vomiting (if not previously present), will furnish the earliest warnings. In many surgical cases, fortunately, this diffi-

culty of diagnosis is of less moment, because the lesion itself justifies operative interference, which thus becomes prophylactic.

The rapid course of traumatic peritonitis renders its prognosis at all times very grave—worst if there be wound of the intestine or other abdominal viscus. In scarce instances, limiting adhesions may form a barrier of safety; but in others the exudation speedily assumes a sero-purulent or ichorous character, and life is soon extinct. Here, surgery should be occurrent against the coming ill, not awaiting its arrival.

Contusion in minor degree oftenest, probably, primarily affects an invested viscus, leading thence to a local peritonitis, which may become diffuse, as in other examples of extension from simple visceral inflammation. Sharp pain and tenderness do not appear until a considerable time—several days, even—after the accident, beginning at the injured point and gradually spreading. The exudate is ordinarily plastic or sero-fibrinous; the prognosis not unfavourable, if the visceral inflammation be resolved. If severer contusion cause lesion of the peritonaeum itself, the onset of inflammation is more sudden and the extension more rapid; the prognosis—especially if any haemorrhage ensue—less hopeful. If crushing violence produce actual rupture of viscera—as of the stomach, intestine, liver, kidney, bladder—with effusion of blood, faeces, or other contents, the diagnosis of the fact, though not always of the seat of the solution of continuity, is generally self-evident; but it is well to remember the cases recorded from time to time since Bransby Cooper's day, in which the severest lesions of this kind were not immediately followed by any characteristic symptoms. The supervention of fatal peritonitis upon such hurts was almost inevitable before modern surgery with disinfectant methods gained courage to attack the causes; and even now the chances of recovery are small. The diagnosis of peritonitis in the very few instances arising from rupture of the spleen or of an aneurysm has hitherto been made post mortem, when prognosis had lost its interest as a question for practical consideration. Abscess usually can,

and should, be detected and relieved before its rupture into the peritonaeum.

Ulcerative perforation of the peritonaeum commonly gives rise to a quickly diffused inflammation, following collapse induced by the accident, the symptoms being similar to those produced by rupture. If the perforation be small, and the intrusion of the contents of the digestive tract very scanty or gradual, limiting adhesions may form, or diffuse peritonitis may occur with few diagnostic indications of its advent. In most of these cases the determination of the exciting cause and of its situation must depend chiefly upon the recognition of preëxisting disease by the physician who has had previous charge of the patient; and every physician should be aware of the possible surgical outcome of a medical malady, and of the fatal mischief of delay when this possibility becomes an actuality.

Gastric ulcer occasionally, though seldom, may escape detection until perforation brings on a rapidly mortal peritonitis. Intestinal ulceration, on the other hand, is always difficult to diagnosticate in its earlier stages, and especially so when arising from uncommon causes. In malarial fevers accompanied by intestinal catarrh, ulceration or sloughing of the colonic glands, or even of Peyer's patches, may proceed to perforation, and the same result may take place in dysentery if the inflammation advance to suppurative disintegration of the muscular coat, the danger here, however, being foreshadowed by the markedly purulent character of the stools. Typhlitis with caecal impaction—ordinarily of favourable prognosis—may possibly lead to perforative ulceration, as may also other mechanical obstructions. Perforation occurring as an incident of enteric fever hardly pertains to our discussion, since it is virtually irremediable by any present resources of our art.

The commonest source of perforative peritonitis is inflammation of that degrading reminder of our evolution from a herbivorous ancestry, the vermiform appendix, which, beside its direct attacks on the serous membrane, is at the bottom

of about ninety per centum of the cases of perityphlitis. And the discovery of this condition is not always easy, for its course may be insidious, with normal temperature, little pain, absence of caecal tumefaction, latency of all characteristic symptoms until the approach of death. I have seen a patient whose only apparent discomfort was obstinate constipation, without abdominal distention, with so little tenderness that he bore without inconvenience sufficiently deep palpation to detect slight thickening in the inguinal region and obscure fluctuation below, and yet incision revealed intense diffuse peritonitis with foul purulent exudation, the appendix perforated, and a faecal concretion extruded.

Supposing that in cases of sudden onset, unheralded by prior ailment, the medical attendant has followed the stereotyped injunction to examine the ordinary hernial openings, the differential diagnosis of internal strangulations or occlusions is generally impossible except by exploratory section. Intussusception—commonly ileo-caecal in youth—may be surmised from the local and often remitting nature of the initial pain and the accompanying dysenteric stools, and verified by palpation; but in the rarer instances where invagination occurs higher in the small intestine, the sense of touch is often baffled, and even if tumor be felt its cause cannot be discriminated from other sources of occlusion. In all such cases purulent, and sometimes gangrenous, peritonitis is likely to result, and more than in other classes is prognosis linked with prompt treatment.

Faecal impaction may induce peritonitis attended with little, if any, rise of temperature, tympanites, or pain, and therefore apt to be overlooked in its earlier stage. In the majority of instances, however, it occurs in the caecal region, and an intermediate typhlitis is discoverable. If the cause be removed, recovery is likely. In cases ensuing upon renal or cardiac lesions, or severe constitutional disorders, the issue is dependent chiefly on the originating disease.

In women, the prophetic discrimination between infective and uninfective inflammation of the peritonaeum is more

important than in men, and often harder to achieve. At best, extension from pelvic peritonitis is of graver presage than that arising from simple affections of abdominal viscera, except, perhaps, in the comparatively benign form which sometimes follows exposure during menstruation, and which has been theoretically ascribed to the intervention of perimetritis. But since peritonitis, like pleuritis, is occasionally induced in men by subjection to cold and damp, it is not always necessary to imagine a distinctively sexual factor otherwise than as increasing susceptibility, save where the menstrual flow is intentionally arrested. Salpingitis as a cause of peritonitis has assumed great prominence of late, and is undoubtedly the intermediary in many infective examples, the fatality of which has been much reduced by gynaecological progress. The frequency of gonorrhoeal invasion through this channel, however, is unreasonably overrated, even by some of those who stop short of Noeggerath's extreme views. We know that the unmistakably specific vaginitis very seldom spreads above the os internum. Daily experience shows that the reliquial discharge of gleet—and, *a fortiori*, any casual serous or mucous secretion long afterward—fails to convey specific virus; and the "gonococcus" (or its twin Dromio) is not confined to gonorrhoeal pus. Sepsis from a retained portion of the ovum, or metritis from mechanical injury, may lead to peritonitis after abortion, as in the puerpera there may be different pathogenic grades, of widely varying significance, from simple metritis to putrid absorption, or to the mysteriously overwhelming septicaemia which may kill before an exudate has formed.

During infancy, the prognosis of peritonitis, from whatever cause arising, is serious in inverse ratio to age. When consequent to infection from umbilical phlebitis or gangrene, within the first few weeks of life, a fatal termination is inevitable. This dangerous period past, the exciting factors differ little from those in adults, but the peril of the resulting peritonitis itself is far greater.

In these prognostic hints the immediate outcome of acute

inflammation only has been considered, the occasional transition into a chronic form not concerning our purpose.

Question V. In what respects are the therapeutic indications in acute diffuse peritonitis modified by the aetiological factors?

It can never be too often reiterated that, while the naming of a mordid condition is a provisional necessity for registration, the given title very rarely conveys a therapeutic indication; and in the case now under deliberation it would be small loss if the word "peritonitis" were relegated to the limbo whereto are already consigned the terms "dropsy" and "paralysis," the latter of which, by the bye, has been misconnected—nosographically, if not etymologically—with the tympanitic distention resulting from oedematous infiltration of the intestinal walls, not from interruption of innervation.

The tendency to hang the panoply of medication on the peg of nomenclature has led, in turn, to the vaunting of venesection, leeching, mercurialisation, antimony, quinine, hot fomentations, cold baths or ice-bladders, as remedies for peritonitis; and to-day a therapeutic disputation weighs the opposing claims of "treatment" by opiates or by cathartics, either of which may be indicated or contra-indicated in particular cases.

In instances resulting from wounds, visceral rupture or perforation, when intensity of pain immediately menaces the heart's function, morphia is temporarily useful; but where surgical measures are so imperatively demanded, further reliance on its beneficial influence is to be deprecated, and, as in acute strangulations, few surgeons of the present day would delay operation until diffuse peritonitis declared itself. In intra-peritonaeal rupture of the bladder, lives were saved by suture of the vesical rent and ablution of the abdominal cavity, in the early days of clean ventral surgery. In intussusception—granting that there are rare recoveries without peritonitis—the risk is so great that operation as soon as

impaction becomes evident is preferable to waiting for the sloughing of half a yard or so of the intussusceptum, or wasting time with ponderous doses of quicksilver or rectal inflation with the kitchen bellows. Wherever, in fine, peritonaeal inflammation is manifestly caused by penetrating or strangulating local lesion, we should no more think of treatment directed to it alone than we should attempt to cure the inflammation produced by a splinter in the skin without removing the splinter. Another justification for operative intervention is the advent of purulent effusion; but here diagnosis is often at fault, since the chills and fluctuations of temperature ordinarily indicative of suppuration are not usually present. In all such surgical examples there is no longer need for the second alleged purpose of opiates, namely, to favour the formation of adhesions, or to secure their preservation by arresting peristaltic action.

But in other than surgical cases this bugbear of "peristalsis" is inconsistently dreaded; for when tympanites occurs peristalsis ceases. In peritonitis from non-perforative typhlitis, or coprostatic obstruction elsewhere, continued constipation itself increases the chance of ulceration and possible perforation; and some of those who most oppose cathartics advocate in such conditions copious and oft repeated enemata, which, if they act at all, must do so by exciting peristalsis. Small "persuasive" doses of calomel at an early stage will often happily prepare the way for slowly administered enemata, and opium, if used at all, should be limited to moderating pain. In cases of this sort, less attention than it deserves has, I think, been given to belladonna, which deadens the sensibility of the nerve-endings, and so allays pain and consequently diminishes reflex irritability, tends to relieve constipation, and supports the heart, embarrassed by pulmonary compression as well as by its own enfeeblement.

Opium—at all events, in narcotic doses—is also contra-indicated where nephritis exists; and, on account of its influence in lowering the already lessened respiratory oxygenation and retarding eliminative processes, is not rationally applicable

to cases where peritonitis is an epiphenomenon of general septicaemia, and where pain rarely calls for an anodyne. In such cases, oftenest in puerperae, foetid diarrhoea commonly coexists. The bowel is freighted with putrescent matter, and mild cathartics and intestinal antiseptics are advisable rather than pharmacological peristaltic paralysis. The same argument obtains wherever decomposition or abnormal fermentation of the intestinal contents lends added danger to peritonitis, as in non-perforative dysentery, some forms of typhlitis, and other similar conditions. The relief of meteorism by calomel (or probably by that portion of it converted into bichloride) was noted many years ago, and in the newer class of remedies, represented by salol and resorcin, we may find useful therapeutic agents in instances of this kind.

It is in "the early stage of peritonitis following operations" of abdominal section, according to Lawson Tait, that the threatened inflammation is most certainly arrested, and a fatal issue averted by "the prompt use of the turpentine enema and the Seidlitz powder;" but in view of the obscure diagnosis of this "early stage" (no well marked symptoms beyond a rise of temperature being often noticeable), I have wondered if some, at least, of these cases were not "fever of non-elimination," occasionally mistaken for septic infection. In other instances, as Dr. A. F. Currier has suggested, neglect properly to replace the omentum, or injury thereto in separating adhesions or otherwise, may be the starting-point of peritonitis; but even here I believe that the chief reliance of gynaecological operators is on saline cathartics. The further discussion of this topic, however, I shall leave to those whose experience in evisceration is greater than mine.

Where purulent exudation is present, or likely to occur, quinia, retarding leucocytic migration, is indicated; and its tonic, and possibly antiseptic, action may render it serviceable in other circumstances. In all instances where the "tendency to death" is by exhaustion, concentrated and easily assimilable nourishment, and stimulants when needed, are more valuable than drugs; and in the frequent virtual

abolition of the function of the upper part of the digestive tract, we should not forget Anstie's rectal alimentation with strong meat broths, under which pain and vomiting are sometimes allayed and the circulation strengthened.

In the uninfective forms of peritonitis, vascular derivation to the surface, by turpentine stupes and light, warm fomentations, is more philosophical than the prolonged and depressing refrigeration by ice-coils, recommended by some disciples of the German school. High pyrexia is rarely maintained long enough to require artificial abstraction of heat; on the contrary, if the issue become grave, a lowering of temperature is a common evil omen. This asthenic proclivity should also absolutely preclude cardiac depressants, such as antimony, aconite, veratrum viride, or the more mischievous group of "antipyretics" headed by the patented "antipyrine."

The clinical details of treatment in different classes of cases will surely be so thoroughly set forth by those who are to take part in the ensuing discussion, that I shall not trespass further upon your time by adverting to them. My task has been accomplished if I have sufficiently emphasised the general proposition that the therapeutic indications are not only modified by, but are altogether dependent on, the causative factors.

QUESTION I.

WHAT DOES THE NORMAL HISTOLOGY OF THE PERITONAEUM TEACH US OF ITS PHYSIOLOGICAL PURPOSE?

By Heneage Gibbes, M. D., of Ann Arbor, Mich.

In the peritonaeum we have a thin, delicate membrane, forming in its ramifications various folds known as mesenteries, omenta, and ligaments. It possesses a considerable amount of strength and a varying amount of elasticity, according to the function it has to accomplish. The framework is composed of white fibrous tissue, arranged in bundles, which interlace and give it the necessary consistency, and among these bundles are networks of elastic tissue, which vary in amount according to the elasticity required in the part. On both surfaces of the free peritonaeum is a single layer of large flat cells, which are the covering cells of the membrane. Among these are longer cells with more sinuous outlines, which belong to lymphatic vessels running in the substance of the membrane. Among the covering cells are small openings called stomata, which communicate with the lymphatic vessels. Running through the substance of the membrane are blood-vessels and nerves. In adult membranes are masses of adipose tissue, and in young animals there are collections of small round cells forming cords around the vessels, or small nodules.

In some animals other structures are found; in the salamander, axolotl, triton, and some of the cheloniada plexuses of non-striped muscle run through the mesentery. In the cat numerous Pacinian corpuscles are found in the mesentery, and particularly in the meso-rectum. In the serous membranes of snakes are peculiar nerve endings which consist of a branch from the main nerve trunk ending in several large pyriform cells.

The covering epithelium of the peritonaeum was considered by Balfour and the Hertwigs to be of hypoblastic origin. Embryologists, however, now seem to consider that it is of connective tissue origin. From certain pathological evidences this does not seem probable. It is important that this point should be settled, as if this epithelium is of hypoblastic origin it may have some secretive function.

We have, then, in the peritonaeum, a delicate yet strong membrane, elastic, and covered on its free surfaces with a single layer of flat cells, among which are openings communicating with lymphatic vessels in the substance of the membrane.

In studying the physiology of the peritonaeum, the lymph is the first thing to be considered. It passes from the blood-vessels on to the surface of the membrane in sufficient quantity to keep it moist, and thus lubricate it and reduce friction to a minimum. This lymph, however, has another most important function, which is, to nourish a considerable portion of the elements which go to make up a serous membrane. In doing this it is deprived of those nutrient materials required by the tissues, and receives in exchange various excrementitious matters. Here are therefore two channels by which the blood is returned to the arteries,—the venous, with a special arrangement for replenishing it, and the lymphatic, by which the serous portion of the blood is returned to the arteries loaded with the products of cell metabolism.

We cannot, however, study the physiology of the peritonaeum unless we consider its pathology, or what may be termed physiology, under abnormal conditions. The peritonaeum is capable of exerting its functions under various conditions which deviate greatly from the normal. This is shown by the large increase in the amount of the fluid exuded from the blood-vessels, which can be absorbed without detriment to the whole organism. And farther, a large amount of foreign, noxious material can be absorbed and removed from the peritonaeal cavity without causing any inflammatory action in the membrane.

I have injected various fluids into the peritonaeal cavity

without producing any appreciable effect on the animal. I have also injected fluids containing pure cultivations of various micro-organisms into the cavity without producing any effect, while the same amount of fluid, containing as nearly as I could judge a similar amount of organisms, when injected into the systemic circulation, blocked up several of the capillaries in the glomeruli of the kidney, causing inflammation and breaking down of small areas in the cortex. It seems to me, from a number of experiments I have made, that the lymph which exudes into the peritonaeal cavity has some action on noxious material, by which it is deprived of its virulence, provided the quantity introduced be not too large. Material which coagulates like blood will, by blocking the stomata, prevent the absorbent action, and inflammation will take place.

I have injected tubercular material in a fluid state into the peritonaeal cavity, and the whole has been absorbed without any tubercular formation taking place in any part of the peritonaeum. In all these cases the only organ affected was the spleen, which in several instances was changed into a sac of pus. Two rabbits were inoculated in the inguinal region with fresh pus from the lungs of a tuberculous cow; three months afterwards they were killed, and in the small intestine of one was a perforation through the wall, about half an inch in length, through which on opening the abdominal cavity a mass of hardened faeces could be seen. The other rabbit had two similar perforations in about the same part of the intestines. Both these animals had the so called artificial tubercles in various organs, containing a number of tubercle bacilli in the caseated parts, but there was no trace of tuberculosis or inflammatory action in the peritonaeum or omentum of either animal. These perforations were probably caused by ulcerations in the wall of the intestine, and there must have been an escape of broken down material into the peritonaeal cavity.

Numerous instances might be given to show that within certain limits the absorbing power of the peritonaeal surface is

sufficient to overcome noxious material and prevent its action in that locality, even though it may not neutralise it or prevent its action at some farther point in the circulation. It has been proved that when excess of fluid accumulates in two serous cavities at the same time from some morbid condition, the composition of the fluids differ in one respect, this difference being quantitative not qualitative. We may infer from this that the normal lymph may differ in like manner, and as the peritonaeal fluid has such marked influence on foreign or toxic material, it may be owing to an excess of the "defensive proteids" described by Hunkin, on the presence of which he builds his theory of immunity from disease.

The absorbing power of the peritonaeum through the arrangement and multiplicity of its lymphatic systems seems to be the most important of its functions. What the significance of the peculiar nerve and muscle structures in some animals is does not seem clear, but that they have some particular function is highly probable.

QUESTION I.

WHAT DOES THE NORMAL HISTOLOGY OF THE PERITONAEUM TEACH US OF ITS PHYSIOLOGICAL PURPOSE?

By George E. Fell, M. D., of Erie County.

It is quite unnecessary to occupy time, in a discussion of this nature, with a review of the development of the peritonaeum with the idea that it might throw some light on its function. We will consider at once the general relations, extent, and detailed structure of the membrane in the adult organism. Our question confines us to the normal histology.

The abdominal cavity is by far the largest in the human organism. The variety of the organs contained within it is greater than that of any other section of the body. Take the spleen, the stomach, the liver, the pancreas, the kidneys, the large and the small intestines, and we have, indeed, a most wonderful collection of complicated organs. From their histology we are enabled to make out much pertaining to the function of these various organs. The histology of the liver, the kidneys, and the pancreas points unmistakably to a general idea of their function. The kidneys probably present the most satisfactory idea of function in relation to their histology. The glandular portions, as well as the Malpighian tufts in connection with the tubuli with their excreting features, point to their eliminative function as excretory organs; while the portal ramifications of the liver point unmistakably to the production of marked modifications in the fluid presented to it. But this is foreign to our subject. These organs last mentioned are among the least movable in the abdominal cavity. Among those which from their functions are more freely movable may be mentioned the stomach, the small intestines, and, less so, various portions of the large

intestines. All of these organs are closely confined together within the parietes of the abdomen. With regard to the mobility of the abdominal viscera, we must recollect that there is absolutely no rest, the inspiratory movments lowering the diaphragm, while the expiratory, immediately following, cause it to ascend towards the thorax. We therefore must bear in mind that during life the contents of the abdomen, to a greater or less extent, are continually in motion; and this in addition to the functional activity of the stomach and the intestinal tract.

The mobility of the stomach is extensive; in its flaccid state it occupies but a small portion of the abdominal cavity. When filled, as it may frequently be in the adult, with from a quart to a gallon, or more than a gallon, of liquid, it occupies a large proportion of the cavity. The intestinal tract is likewise much increased in size following the ingestion of a large meal. Then the functional activity of these organs, in addition to their movements through the respiratory function, must not be lost sight of, and varies in character to a greater or less extent. Those who have not witnessed the action of peristalsis, in which the calibre of the intestinal tube is decreased greatly with the peristaltic wave passing to and fro, cannot readily appreciate the wonderful mechanism which permits this condition to exist without detriment to the tissues subjected to this varying state; and yet provision is made for the harmonious movement of all these various organs during the lifetime of the human organism. The conditions which must be met to permit these functions to be fulfilled are those of a perfectly lubricated surface, which may be enlarged or contracted; in which the lubricant must be always supplied in greater or less amount to permit the innumerable surfaces, presenting in every conceivable shape, to move smoothly and unremittingly upon each other during life. We must have a tissue with considerable strength to support the various organs, and at the same time prevent friction to the slightest degree as inimical to the thorough carrying out of the functions of the organs contained within

this surface. Through the arrangement of the mesentery the various arteries, veins, capillary vessels, nerves, and lymphatics communicate with these more or less movable organs, and covering them all we find the peritonaeum, that wonderful fibro-lymphatic epithelial coat constructed to meet all these varying conditions.

Let us dwell for a few minutes upon the extent of the peritonaeal coat. Covering, as it does, the parietes of the abdomen, we have here a large surface presented. Add to it the mesentery and twenty-eight to thirty-two feet of small intestines, and we need not go further excepting to add that the surface of the largest gland in the body, the liver, is almost completely covered, as well as the stomach; and yet that does not begin to give an idea of the extent of surface of this important membrane, though sufficient to suggest the influence which abnormal conditions of so extended a surface might produce upon the central nervous system.

And now, as to the structure of this most important membrane of the body. Histological methods show that the parietal and visceral surfaces are composed of pavement endothelial scales, with their edges closely approximating, placed upon a "basement" membrane made up of connective tissue, mainly of the fibro-elastic variety. In this basement membrane, in close proximity to the cells, blood-vessels, lymphatics, and nerves are distributed. At intervals, minute openings between the cells, termed *stomata*, have been observed. This being the general character of structure of this membrane, we can imagine that through the fibro-elastic tissue, and the modifications which the endothelial cells themselves may undergo in their contraction and expansion, we have presented the important factors which permit this membrane to adapt itself to the various changes in size and form of the organs which it surrounds. Through what may be termed the lymph channels in its structure, we may readily comprehend the nature of the lubricating material with which it is supplied,—and we must remember that this membrane is controlled, as all other organs of the body, in degree of activity

of function, through the wonderful nervous mechanism so complete in the digestive organs of the body. We may look upon the stomata as the larger channels by which excessive quantity of fluid is thrown out for special or extraordinary conditions of lubrication, as well as the routes through which such excess may be drawn into the lymph channels more rapidly than would be possible through the osmotic action of the epithelial cells, for it is not unreasonable to consider that the current may be, if occasion requires, in the opposite direction, to supply the spaces between the epithelial surfaces rapidly with a lubricant. It is reasonable, in my opinion, to believe that the cells themselves permit to pass to their surface a sufficient amount of lymph to meet their lubricating requirements when in contact with the surface of opposing cells or other portion of the membrane, that the amount of lymph fluid passed through these cells may be graded by the pressure of opposing cells, greater or less, as it may be, to which they are subjected, so that we have a wonderful condition of activity prevailing in the epithelial cells of the peritonaeum at all times during life. To appreciate the wonderful lubricating property possessed by these surface epithelial cells of the peritonaeum, we have only to take, shortly following death, and press the peritonaeal surfaces of the large and small intestines together with a sliding motion. We shall find that there is no resistance appreciable in this experiment; so that we are forced to consider that the histology of the peritonaeum teaches that it is a membrane protective to a certain degree, with a lubricatory function which permits the various organs contained within it to move in accordance with their purpose without hindrance or impediment; to permit the various functions to be carried on at the least expense of energy and waste, that, like all the works of nature, so wonderfully exhibited in the physiology of the human organism, there is little to find fault with and much to excite the widest admiration for the simplicity of the methods and their perfectness, wherever we meet with them.

QUESTION II.

DO PATHOLOGICAL AND CLINICAL CONSIDERATIONS WARRANT THE SEPARATION OF CASES OF ACUTE DIFFUSE PERITONITIS INTO DIFFERENT CLASSES, SOME INFECTIVE, OTHERS NOT SO?

QUESTION IV.

WHAT ARE THE MEANS OF DIFFERENTIAL DIAGNOSIS BETWEEN VARIOUS FORMS OF ACUTE DIFFUSE PERITONITIS, AND WHAT THE PROGNOSIS IN EACH?

QUESTION V.

IN WHAT RESPECTS ARE THE THERAPEUTIC INDICATIONS IN ACUTE DIFFUSE PERITONITIS MODIFIED BY THE AETIOLOGICAL FACTORS?

By E. D. Ferguson, M. D., of Rensselaer County.

The request came to me to deal as fully as I wished with questions two, four, and five, and after a consideration of the problems and a review of the names of those who are to take part in the discussion, I have concluded to limit what I have to say to some statements bearing on one or two points in each question named without undertaking a general consideration of even a moiety of the conundrums to be found in those queries. My talk may at times be about, rather than upon, the subjects.

While it will be accepted as proved that certain infective agents cause acute diffuse peritonitis, the converse is not so clear, *i. e.*, that acute diffuse peritonitis may arise from non-

infective causes; for to prove a negative in this instance would hardly be possible.

It is manifestly important to agree on definitions. By "diffuse peritonitis," are we to understand an inflammation that invades every portion of the peritonaeal surface? or, may we accept the term as applicable when a *considerable* extent of that surface is involved? I conclude that in a general way we may accept the latter proposition without trying to give a quantitative value to the word "considerable," though allowing it *considerable magnitude.*

As to the word "infective," it has been customary to limit its descriptive value to the idea of living agents in the class of micro-organisms, though recently there is a disposition to include the supposed products of those organisms under the title of ptomaines, unorganised ferments, animal alkaloids, or toxines as active agents in the production of inflammation.

Much of all this is in a speculative stage, though much has been done to clear the ground and give a field for further investigation.

While not able to assume with certainty that acute diffuse peritonitis may arise from non-infective sources, still, in the present state of our knowledge of pathology, it seems probable that it can have such an origin, for the fact that mechanical irritation will produce a variety of the inflammatory process practically settles the question, it being only necessary to assume a certain diffuseness of the irritant or irritation, and that is quite possible. Clinically we find cases that do not correspond to the usual ideas of an infective peritonitis. We find instances showing diffuse abdominal pain and tenderness, rigidity of the abdominal muscles, and finally a clear serous effusion, followed by recovery with or without paracentesis, and this in cases in which there is no evidence of hepatic or renal trouble, of rheumatism or tuberculosis.

While it is possible that a very mild-mannered and specially minute variety of micro-organism may be responsible for such cases, the verdict at present must stand "not proven."

Leaving for others a consideration of Question IV in

detail, I will devote a few words to the matter of diagnosis, although not particularly in the differential line as the question would seem to require, but then it is only the proper liberty we may all take with a text, *i. e.*, accept the text and speak of what else we prefer.

A clinical instance may prove of interest, and serve to illustrate at the same time that these are interesting aetiological problems connected with a disordered chemistry of digestion.

In the case of a child, I was consulted with reference to doing a laparatomy for the relief of peritonitis. I found that there had been about a day of invalidism; there was some distention of the abdomen, the abdominal walls tense and board-like, abdominal tenderness and pain, some fever, etc.; but from the rather sluggish condition of the mental faculties, the absence of any probable cause for a diffuse peritonitis of such rapid development, the absence of constipation and a regurgitant vomiting of a thin mucus, I ventured the opinion that it was not a case of peritonitis, but that there was a production of poisonous alkaloids going on in the bowels, beyond the capacity of the liver to serve as a graveyard or crematory for such compounds, and that it would result in a profound toxic effect on the nerve centres, a diffuse interstitial and parenchymatous hepatitis with a resultant increase of pressure in the gastro-intestinal veins, haematemesis of the "black vomit" variety, and death. The opinion was justified so far as the result was concerned, for death occurred within two days, and the autopsy showed an absence of the evidences of peritonitis, except the altered texture of the hepatic peritonaeum due to a perihepatitis. Within a few years I have seen several similar cases, and in some of them the diagnosis had been peritonitis, but when an autopsy was had the condition found corresponded in a general way to that in the case just given, *i. e.*, no peritonitis, but the evidence of rapidly developed diffuse hepatitis with gastrorrhagia and occasionally enterorrhagia.

Another case which occurred during last month was specially interesting to me. There was a gunshot wound of the

abdomen, and I closed a penetrating wound of the transverse colon, and removed a large amount of blood from the peritonaeal cavity. The patient's progress for three days was without accident or trouble so far as the operation and injury seemed to be directly concerned. He had no fever, no tympanites, and but little disturbance of the pulse, but there was a persistent ejection from the stomach of a moderately viscid mucus which led me to conclude that stercoral empoisonment was developing, and the appearance of some dark streaks in the ejected material heralded the black vomit, a distended belly, some fever, stupour, and a fatal issue after five days. The autopsy showed a clean peritonaeal cavity, and no peritonitis except of the adhesive variety at the areas of operation, but the liver was shrunken and leathery in its left lobe, and the same process was evidently present in a less advanced stage throughout the rest of the gland. The pathological condition seemed akin to acute yellow atrophy of the liver.

The patient, though only nineteen years of age, had probably used alcoholic stimulants freely.

While many of the cases like the foregoing have at some portion, or even during the entire course, simulated acute diffuse peritonitis, yet the autopsies so far have failed to show it. Nevertheless it seems probable to me that the development in the bowels of a toxic agent capable of producing such morbid conditions might, under certain conditions, allow the passage of the toxine or other agent through the coats of the bowel so as to cause a peritonitis.

This idea was impressed upon me by a case of intestinal obstruction in which I operated at the solicitation of the attending physician and family, though with the statement and conviction on my part that the procedure would fail to cure, as the patient seemed to me to be already hopelessly poisoned. I found obstruction by a band near the sigmoid flexure. The obstruction was removed, and no laceration, rupture, or perforating ulceration of the bowel existed,—at least there was no direct evidence of such a lesion; but there was an acute diffuse and purulent peritonitis of an intensely septic nature, as

I discovered within twelve hours after the operation, through the means of a very slight prick to one of my fingers while closing the abdominal wound.

The removal of the obstruction and the irrigation of the abdominal cavity gave relief to the patient so far as the abdominal distress was concerned, but he died from toxaemia, and I had a lively but fortunately short period of septic infection.

We are waiting for our chemical confrères to tell us all about these toxic compounds that are developed so near to the peritonaeum, though we fear we must wait a long time for some of the details, for the problem is manifestly too complex to be solved speedily; but we are beginning to suspect that operations on the abdominal and pelvic organs may occasion their development. In an ovariotomy done a few months ago, though there was no renal trouble, no difficulty or accidents connected with the operation, still the patient soon began the ejection from the stomach of a thin mucus, which finally gave place to coffee-ground vomit, and death on the sixth day in spite of the efforts to remove the toxic agents by saline cathartics, which acted fairly well.

This brings me to say a few words relative to the fashion at present somewhat prevalent of treating peritonitis, particularly those cases when the disease follows laparotomy, with saline laxatives. It seems to me that there is a prominent general principle that should still guide us in the management of our cases of peritonitis, and it may be expressed in two words—remove irritation. The trouble begins when we try to decide on the source of irritation, the prevention of its development, or its removal; and by having a one-sided pathology we may overlook practical indications for relief.

When the peritonaeum is roughened by inflammation or other cause, peristalsis must cause mechanical irritation, and in addition it would tend to the spreading of irritating products, as pus, etc. In so far as the opium splint will lessen this source of irritation it is logical, but if there is ground to conclude that the origin of the irritant is within the bowel,

and that constipation would favor either its production or absorption, then a cathartic that will tend to produce efficient evacuations with the minimum mechanical disturbance is indicated; and the saline laxatives seem to serve this purpose the best, with Epsom salts at the head of the list.

On the other hand, if the irritant does not reach the peritonaeum through the walls of the intestines, or if its culture bed be within the peritonaeal cavity, then catharsis seems not only of doubtful utility, but positively contra-indicated.

Under such conditions, opium, to give rest to the bowels and so lessen the dispersion of the irritant, or irrigation and drainage for the removal of the products of the infective processes, would seem logical, and to have been justified by experience. It does not seem probable that we have yet come to the time when the majority of surgeons will order a dose of Epsom salts on the day following a laparotomy for gunshot wound of the bowels as routine practice.

The dose of salts that may be given is not always the means to recovery, nor would every patient that died under the opium treatment have been benefited by saline purgation, and it surely will not be necessary to give to this audience cases illustrative of the prompt abatement of the usual evidences of peritonitis on securing the full effect of opium. The facts and logic now seem to show that there is a field for each line of treatment, but into which class individual cases should be placed must be left to the judgment, and, I may add, the bias, of the physician.

QUESTION II.

DO PATHOLOGICAL AND CLINICAL CONSIDERATIONS WARRANT THE SEPARATION OF CASES OF ACUTE DIFFUSE PERITONITIS INTO DIFFERENT CLASSES, SOME INFECTIVE, OTHERS NOT SO?

QUESTION III.

WHAT PART DO MICRO-ORGANISMS, OR THE PRODUCTS OF FERMENTATION CAUSED BY THEM, PLAY IN THE PATHOGENY OF DIFFERENT FORMS OF ACUTE DIFFUSE PERITONITIS?

By Harold C. Ernst, M. D., of Boston, Mass.

When the invitation to take part in the present discussion was extended to me, I was requested to give especial attention to that part of it that bears particularly upon the aetiology than upon the treatment.

This I was the more willing to do for two reasons,—the first being that of course the aetiology of a process must be fairly well understood before its treatment becomes of value; and the second, because it is in the direction of the aetiology that what special knowledge I have is in any degree complete.

The questions, as stated, are as follows:

"II—*Do pathological and clinical considerations warrant the separation of cases of acute diffuse peritonitis into different classes, some infective, others not so?*"

"III—*What part do micro-organisms, or the products of fermentation caused by them, play in the pathogeny of different forms of acute diffuse peritonitis?*"

It seems to me that the two questions cannot well be considered separately,—but that if they are separated, the second should be taken up first; for it is only after one has defined one's position in regard to the causation of peritonitis, and after it has been granted or denied that bacteria or their products are the only causal factor present, that one can begin to separate peritonitis into infective and non-infective forms.

Pathological considerations by themselves—as distinct from bacteriological—furnish no trustworthy data upon which to base an opinion; and we must, therefore, look to the results of experimental work for material upon which to found our conclusions.

In doing this, it is not possible to consider peritonitis as a process separated by any line, except that of locality, from similar changes that may go on in other parts of the body, or as one to which any special peculiarities of aetiology can be ascribed, other than those due to anatomical peculiarities.

From this point of view, then, peritonitis is to be looked at in the light of the enormous body of facts that have been collected in late years as the result of the newer methods of research. Quoting from the *Medical News* of several years ago, it is true that "the micrococcus is but a child of yesterday;" but it is also true that our knowledge, that is as of yesterday in regard to the various organisms of which the micrococcus is but a division, furnishes us with a working basis for determining the aetiology of various processes, far in advance of anything that has been had before.

This knowledge teaches us several things in regard to acute inflammatory or suppurative lesions that must, for the present, it seems to me, be taken as proven.

Of these, the most important appears to be he final disposition that has been made of the theory of "spontaneous generation."

The idea that it was possible for such processes as suppuration or inflammation in general, or of peritonitis in its various forms in particular, to make their appearance *de novo*

and without external influences, has cost more to the medical profession than it would be easy or pleasant to estimate.

If nothing else could be said, the determination of spore formation and its significance was a tremendous advance. But there is more than this that has been learned. We know, so far as we can be said to know anything—it certainly appears to be proven by exact demonstration—that at least most acute inflammatory and suppurative action occurring in the human body is due to the activity of one or more of the lower forms of life included among the bacteria.

It is true that certain experiments tend to show the possibility of the production of localised necroses resembling in certain respects what we call suppuration, but there is nothing to show that these results are of any more than experimental interest, or that they are to be considered as factors in determining the aetiology of inflammatory or suppurative processes as occurring in man.

These results are of the greatest importance, and are generally acknowledged and accepted. They are the general conclusions to be drawn from the mass of experiment recently put forward, and can be disturbed only by equally convincing evidence in other directions.

Looking for special experimental investigations directly concerned with peritonitis, there is not much to record.

Pawlowsky,[1] who has done some of the earlier and most extensive experimental work upon the aetiology of the process under consideration, succeeded in obtaining haemorrhagic, but never a suppurative, peritonitis by the injection of croton oil and turpentine. He divides peritonitis into two forms,—the first the result of chemical agents, the second the result of infection. He declares that he could never produce a suppurative peritonitis with pure chemicals or certain ptomaines that he isolated and made use of, but that this could only be obtained when active bacteria were employed. He isolated what he called, "bacillus peritonitidus ex intestinis cunic-

[1] Cent. f. Chir. 1888, No. 48;—Cent. f. Bact. Bd. V, s. 715;—and Virch. Arch. CXVII, s. 419.

uli,"—a most formidable name, but apparently deserved by reason of the active powers of the micro-organism. This much for experimental work upon the production of the process.

E. Fraenkel and Predohl[1] made examinations of the exudate in a number of cases of suppurative peritonitis, and showed the presence of bacteria on so large a proportion of them, that they came to the conclusion that the process is distinctly a mycotic affection, and disagree with the results of Bumm.[2] The latter author differentiates peritonitis into three classes,—(1) aseptic, accompanied by fibrinous exudation, and as a rule circumscribed; (2) septic; (3) specific,—this last class including all the forms the result of tuberculous infection.

This includes most of the work that has been done especially upon peritonitis from an experimental point of view, and furnishes a very small amount of data for the settling of the question, if taken by itself. But when considered with the results of all the other experiments upon the inflammatory and suppurative processes as a whole, it is exceedingly interesting.

For neither here, nor in that larger mass of work, does the inquirer find at all sufficient grounds for the separation of different clinical forms of peritonitis even into septic and specific,—much less for the setting off of a class of cases as aseptic.

It certainly seems as if it were proven that all forms of peritonitis occurring in human beings were due to the activity of bacteria or their products, and that they are all of them, to that extent, "specific" and "septic" also. For in almost every case that has been examined, it has been possible to demonstrate the presence of bacteria possessed of pathogenic powers; and where this has not been done, it is but reasonable to suppose that the micro-organisms have either died out at the time the examinations were made, or

[1] Munch. Med. Woch. 1890, No. 2.
[2] Munch. Med. Woch. 1889, No. 42.

else that the effects seen are due to certain of their toxic products.

This does not deny the possibility of the existence of a process closely resembling a non-suppurative peritonitis, and due to the action of some irritant or caustic chemical.

To include such a process with peritonitis as it is understood clinically, seems as unreasonable, however, as to call the same sort of chemical destruction occurring on the surface of the body an erysipelatous process. They are two entirely distinct things, with nothing more in common than their occurrence in the same locality; and if we are to benefit by the new knowledge we think we are gaining, we must subscribe to the new aetiology that this knowledge brings to us.

The few experiments that I have myself made in this direction all tend to show the same thing. I have not succeeded in demonstrating the existence of a peritonitis in human beings, where there were not present certain forms of bacteria that were endowed with more or less active pathogenic powers. Nor have I been able to produce an acute peritonitis in the lower animals, that was not due to the activity of bacteria or their products.

My answer to the two questions that I have especially considered would be this: 1. It seems to me that no sufficient evidence has as yet been brought forward to show the occurrence of a true peritonitis without the activity of some of the bacteria. 2. Neither pathological nor clinical experience, as corrected by experimental data, warrants the separation of peritonitis into "infective" and "non-infective" forms. There is true peritonitis, varying very widely in its clinical manifestations and methods of occurrence, but due in all cases, as we are justified in believing, to the action of micro-organisms or their products.

There may be another process, the result of chemical action, other than that of the bacterial alkaloids,—but this is entirely distinct aetiologically, and to be separated, for that reason, from true peritonitis.

QUESTION III.

WHAT PART DO MICRO-ORGANISMS, OR THE PRODUCTS OF FERMENTATION CAUSED BY THEM, PLAY IN THE PATHOGENY OF DIFFERENT FORMS OF ACUTE DIFFUSE PERITONITIS?

By Victor C. Vaughan, M. D., of Ann Arbor, Mich.

Mr. President and Gentlemen: Notwithstanding the fact that the bacteriological studies of acute diffuse peritonitis have not been altogether harmonious and conclusive, I will attempt to answer the question concerning the relation of micro-organisms to this disease. I wish, however, to reserve the right to make such modifications of my answer in the future as further researches may demand. In order to present the matter to you in the most comprehensive form, I will state certain propositions which I believe to be true, and shall append to each a brief statement of the grounds upon which it rests.

(1) Although germs are found abundantly in the various forms of exudate occurring in this disease, no one species or kind is found invariably present.

Bumm finds in one class of cases a streptococcus, and in another class a great variety of non-specific micro-organisms. In fifteen cases of suppurative peritonitis, Fraenkel reports a streptococcus, which he believes to be identical with that of erysipelas, and he has induced in rabbits a typical form of erysipelas by inoculation with this germ. In fourteen cases Predöhl has detected the streptococcus pyogenes in seven,—as a pure culture in three, and mixed with other germs in four. In one case, the exudate was a pure culture of a small coccus, and in the others, varied forms appeared. From forty-two cases Boisleux has isolated as many as nineteen kinds of virulent bacteria, some of which could not be iden-

tified as belonging to any known species. Netter, Debove, Boulay, Weichselbaum, and others have found the pneumonococcus both in pure and mixed cultures, and both with and without the simultaneous existence of pneumonia. The bacterium coli commune has also been found in pure culture by Laurelle and others. Other germs have been found; but this list is sufficient to prove the truth of the above proposition.

(2) Peritonitis may be induced experimentally in animals with any one of a number of germs.

Experimentally, peritonitis has been induced in the lower animals by inoculation with staphylococcus pyogenes,[1] with bacillus pyocyaneus and the so called bacillus peritonitidus,[2] with the bacterium coli commune,[3] with the diplococcus pneumoniae,[4] and with infusions of putrid meat.[5]

(3) At least one germ (bacterium coli commune) which normally grows in the healthy intestine may induce peritonitis after passing into the peritonaeal cavity.

The truth of this statement has already been established in giving the evidence in favour of the first two propositions. The bacterium coli commune has been found in pure culture in the exudate in this disease, and the disease has been induced in animals by inoculation with this germ. This is a point of much practical importance. It is probably true that actual perforation is not necessary to the passage of this germ through the intestinal walls, but that this may occur when the mucous membrane becomes necrotic from simple inflammation, or is destroyed by non-perforating ulceration.

(4) While it is true, as stated above, that peritonitis may be experimentally induced by the injection of cultures of certain germs into the peritonaeal cavity, the success of these experiments is influenced by certain conditions.

The more important of these conditions are the following:

[1] Pawlowsky, Waterhouse, and others.
[2] Pawlowsky.
[3] Laurelle and others.
[4] Weichselbaum.
[5] Grawitz.

(*a*) The presence in the peritonaeal cavity of chemical irritants. Thus, it has been found by Pawlowsky and others that the previous injection of amounts of croton oil and trypsin, too small to cause the disease in themselves, increases greatly the per cent. of successful experiments following the subsequent inoculation with germs. It has also been found that the healthy and unirritated peritonaeum is not affected by considerable quantities of the most highly pyogenic germs when these are suspended in distilled water and injected; while, on the other hand, the injection of a much smaller quantity of the same germ in liquefied gelatine, or along with bits of agar-agar, causes a speedily fatal suppurative peritonitis. The presence of a blood-clot increases greatly the risk of peritonitis. Surgeons, I think, generally appreciate the lesson taught in these experiments. In laparotomies, all incisions are made with sharp, clean-cutting knives; the bruising of tissue and the subsequent formation of necrotic masses are avoided as far as is possible, all blood-vessels cut are immediately ligated, and haemorrhage into the cavity avoided; and, finally, the cavity is carefully cleansed with sterilised water.

(*b*) The state of health of the peritonaeum. Waterhouse found that the injection of pus and cultures of the staphylococcus pyogenes into the peritonaeal cavities of ascitic cats, after the withdrawal of the fluid, was invariably followed by death from peritonitis. The abnormal condition of the peritonaeum probably formed an important factor in the production of these results.

(5) Experimentally, an aseptic peritonitis may be induced by chemical irritants.

Pawlowsky induced peritonitis in dogs and rabbits by the injection of sterilised emulsions containing two drops of croton oil. The absence of germs in the exudate was shown both by microscopical examination and by the preparation of culture plates. Pawlowsky lays considerable stress upon the fact that the peritonitis which followed these injections was haemorrhagic rather than suppurative, but in some instances

he found leucocytes in large numbers. Moreover, the amount of oil which he used produced death so speedily that there was but little time for the inauguration of suppurative processes. He calls attention to this fact in those cases of speedy death which followed the injection of germs, but overlooks it in the aseptic cases. This oversight is possibly explained by the fact that he was an earnest believer in the dictum, "no suppuration without bacteria." The same experimenter induced peritonitis by the injection of sterile preparations of trypsin into the peritonaeal cavity. The fact that trypsin induces peritonitis proves that, apart from its contained germs, the contents of the small intestine are sufficient to cause the disease in cases of perforation. Whether complete perforation is essential to the passage of the digestive ferments into the peritonaeal cavity or not, I do not know.

This brief report is respectfully submitted as a résumé of our knowledge upon this subject to the present time.

QUESTION V.

IN WHAT RESPECTS ARE THE THERAPEUTIC INDICATIONS IN ACUTE DIFFUSE PERITONITIS MODIFIED BY THE AETIOLOGICAL FACTORS?

(*a*) *From wounds, contusions, rupture of the bladder or other viscus, or of abscess or aneurism, perforation, intussusception or strangulation, typhlitis, caries of bone, gall-stones, infection in the course of lymphangitis.*

By B. A. Watson, M. D., of Jersey City, New Jersey.

This question presents for our consideration acute diffuse peritonitis in which the pathological lesions are more or less modified by the aetiological factors. The rational treatment of all these cases requires that mature thought should be given to their aetiology, and also to the physical condition and hygienic surroundings of each patient. It will likewise be observed, that in the discussion of this question we are restricted to those cases in which there is an acute diffuse peritonitis. The existing morbid condition, the extent of the pathological changes, and the *vis medicatrix naturae* are more or less clearly indicated by the symptoms. The hygienic surroundings are likewise within the mental grasp or comprehension of the attending surgeon. However, with a full knowledge of all these factors, including the aetiology, physical condition, and hygienic surroundings, the surgeon will frequently find himself hesitating in regard to the selection of a therapeutic agency. A thorough knowledge of the individual case in all its points is absolutely necessary to prepare any surgeon to make a selection of the therapeutic measure adapted to treatment. To act on less than this would be a crime against human life and the science of surgery. It would therefore appear, on a superficial examination of the

question under consideration, that our field is so much restricted that no practical results can follow its discussion; but this is not, however, absolutely true, since the real object of our investigations is to determine "in what respects the therapeutic indications in acute diffuse peritonitis are modified by the aetiological factors" in certain traumatisms. These traumatisms all stand in the relation of cause and effect, while the danger to life arising from them largely depends on the organs involved, the extent and character of the injury inflicted, the nature and degree of the peritonitis following the same, while the therapeutic measures employed should be those which are best calculated to meet the indications in each individual case. It should be here remembered that our consideration of the cases under discussion is restricted to those in which there already exists acute peritonitis; but even these cases differ more or less in the nature of the inflammatory action and other complicating factors,—such as the attending shock, the degree of septic infection, etc.,—and these conditions possess an important bearing on the therapeutic indications.

It is scarcely necessary to add here that no surgeon would recommend an operative procedure unless it afforded at least a remote possibility of saving life, or of giving some important relief which could not be gained by some less objectionable means. Let us suppose, for the purpose of illustrating our views, that a surgeon has been called to a case of rupture of the bladder a few hours after the infliction of the injury, and finds that there is clearly an acute diffuse peritonitis and the patient in a state of collapse: there would be no longer any thought of surgical interference, but it might be proper to administer stimulants, etc. The other extreme of the case is equally clear: namely, should a surgeon be present at the moment of occurrence of a rupture of the bladder, he ought without delay to open the abdominal cavity and suture the ruptured organ, taking the required aseptic precautions, etc. In this instance the nature of the pathological lesion supplies the true indication for the treatment of the case, since a

rupture of the bladder with its attendant urinary infiltration is extremely dangerous to life when the operative procedure is delayed even a few hours. It is between these extremes which we have mentioned, where the surgeon finds the real dilemma, frequently hesitates, and sometimes neglects to perform his duty. It is of this condition that Colton says,— "Doubt is the vestibule which all must pass before they can enter into the temple of wisdom: therefore, when we are in doubt and puzzle out the truth by our own exertions, we have gained something that will stay by us, and which will serve us again." Shakespeare says,—

> "Our doubts are traitors,
> And make us lose the good we oft might win,
> By fearing to attempt."

In these extremes there are the same aetiological factors which we have already mentioned, and they point to the same therapeutic indications; but we should not overlook the varied complications when the question of treatment is under consideration.

The rupture of the bladder or any other viscus within the abdominal cavity presents for our consideration a most serious subject, especially while the injured organ continues to discharge into the peritonaeal cavity that material which has already given rise to an acute diffuse septic peritonitis. This case is analogous to that in which one of the large arterial trunks has been severed, since in both cases death is inevitable unless the proper therapeutical measures are promptly applied. In the former instance ligation of the vessel is commonly the most appropriate agency, while in the latter the performance of laparotomy, suturing of the ruptured viscus, and the removal of all foreign and septic substances from the cavity, are the primary indications based on the aetiological factors. The same therapeutical measures may be still further supplemented by the use of large doses of germicidal agents, with the intention of saturating the system as speedily as possible and thus arresting the progress of the septic inflammation. I have employed in these cases the bichloride of mercury, giv-

ing to adults one grain *per diem* in three doses, with marked advantage. I have observed no perceptible effect from this treatment during the first three days, but by the end of the sixth there is commonly a very great improvement. The septic inflammation rapidly subsides, and the secretion of pus is quickly arrested. The therapeutical indications based on the aetiological factors in caries of bone and abscesses within the abdominal cavity are precisely the same as in the case of a ruptured viscus. Mr. Frederick Treves, F. R. C. S., now opens pus collections arising from caries of bone within the abdominal and pelvic cavities, carefully removing the septic and foreign substances and then closing the wound.

These surgical procedures under strict aseptic precautions are constantly affording the most satisfactory results. It is true that much has already been said and written in favour of the Listerian system of surgery; but still one half the advantages arising from a strict adherence to its principles are not yet fully appreciated even by surgeons. In acute diffuse peritonitis arising from the rupture of a viscus, the therapeutical indications demand the performance of laparotomy at the earliest possible moment, while in other cases of septic origin, when there is no pus formation, the common surgical practice of the times will not warrant this procedure. In these cases prophylactic measures should be employed until a pus formation has taken place, and then the greatest safety will be secured by following out the course indicated for the treatment of abscesses within the abdominal cavity. Now the earlier the operation is performed the greater will be the chances for the patient to recover. I firmly maintain this position, although fully aware that in some cases recoveries do take place without surgical interference. These recoveries are, however, very rare,—forming an exception to a general rule,—and should, therefore, never give rise to hesitation or cause a delay which may cost the patient his life. Intussusception and other forms of intestinal obstruction may be caused either by malignant or non-malignant diseases. Intestinal obstruction may be complete or incomplete. The thera

peutic indications in all cases of complete intestinal obstruction most imperatively demand prompt relief. It is not, however, my intention to dwell here on the therapeutic measures which should be employed before laparotomy is performed. Let it suffice to say that every reasonable and proper effort should be made to overcome the obstruction, with the least possible danger to the life of the patient. It is unquestionably true that many valuable lives are lost by fruitless and ill directed efforts to avoid a cutting operation. The management of strangulated hernia has taught us one important lesson which bears strongly on the topic now under consideration. It can no longer be doubted that the ill directed efforts at taxis are far more dangerous to human life than strangulated hernia itself. Experience has taught us that herniotomy, when properly performed in cases of strangulation—under proper aseptic precautions—is almost without danger. The question may be raised how much time should be spent in the efforts at taxis. In reply to this query the answer should be, Only so many minutes as will enable the surgeon to convince himself that the strangulation cannot be relieved by taxis without some risk of doing injury to the soft parts. Thus, in cases of the strangulation of an inguinal hernia, the patient should be placed under the profound influence of an anaesthetic, the hips well raised, and a proper effort made at taxis, which having failed, the surgeon should immediately proceed to operate. Analogous reasoning suggests to us that in all cases of complete intestinal obstruction promptness is an important desideratum. The greatest difficulty which the surgeon encounters in dealing with intestinal obstruction is found in making a correct diagnosis. The difficulty found in accomplishing this object suggests the propriety of resorting more frequently than is now done to the performance of explorative laparotomy. The advantages of this operative procedure ought not to be limited strictly to the mere determination of the character of the intestinal obstruction, but the surgeon should likewise be prepared to proceed immediately to perform such additional surgical operations as may be required to put the patient in the

most favourable condition for recovery. The operative procedures will commonly restrict themselves to the performance of lumbar-colotomy, colectomy, or the establishment of a free communication in the healthy gut above and below the obstructed point. The latter operative procedure possesses so many advantages over the two preceding operations, that the former should seldom be performed. Here, however, the aetiological factors should determine the therapeutical measures which ought to be employed. Therefore, if the intestinal obstruction is due to the existence of malignant disease, or should the intestine be already gangrenous, colectomy or lumbar-colotomy should be preferred to the establishment of an anastomosis above and below the point of the obstruction.

QUESTION V.

IN WHAT RESPECTS ARE THE THERAPEUTIC INDICATIONS IN ACUTE DIFFUSE PERITONITIS MODIFIED BY THE AETIOLOGICAL FACTORS?

(b) From faecal impaction; extension from enteritis; hepatitis, or disease of other abdominal viscera; in dysentery, or typhoid ulceration without perforation; incidental to paludal or exanthematic fevers, to albuminuria, scurvy, cardiac disease, rheumatism; from exposure to cold and damp; from decomposition of intestinal contents.

By William H. Flint, M. D. of New York County.

In considering the indications for the treatment of acute diffuse peritonitis as modified by the aetiological factors above enumerated, the writer would divide these causative conditions into two categories, viz., those which produce peritonitis by the direct extension of inflammation from neighbouring tissues, and those whose effect is exerted from a distance or through the medium of the blood or the lymph.

This division of the subject seems rational, since it permits of some generalisations relative to the management of cases belonging to either of the classes thus arbitrarily established, and obviates the necessity of reiterating principles applicable with certain modifications to individual members of these classes.

We may thus enunciate the general principle, that the indications in the treatment of cases of acute diffuse peritonitis arising through the extension of inflammation from neighbouring tissues relate, first, to controlling the peritonaeal inflammation; and, second, to the removal of the primary causative conditions or diseases.

The writer considers this a useful working rule in most

cases, because any attempts at the immediate relief of the causative diseases are likely to result in the aggravation of the peritonaeal inflammation. It is true that in many cases whose aetiological factors belong to the first class, measures for the cure of the primary inflammation may be judiciously combined with those whose purpose is the relief of the secondary peritonitis. Allusion will be made to some of these cases during the consideration of the individual causative agents, which will presently be mentioned in their regular order.

1. *Acute peritonitis from faecal impaction.*

The indications in peritonitis from this cause are, first, to control the inflammation, and then to remove the faecal impaction. Attempts to relieve the bowels, either by mechanical or by medicinal means, are generally useless after the inflammation has once been fully established, because the muscular coat of the intestine is so involved in the inflammatory process that it will not respond to any stimulus. Injections are therefore likely to be retained below the seat of impaction, and if introduced with force may imperil the integrity of the intestinal parietes. Purgatives would accumulate above the impacted masses, unless rejected by reversed intestinal peristole and acts of emesis.

Until the inflammation shall have abated, the patient should, therefore, be kept in a strictly recumbent position, and opiates should be used with sufficient freedom to control all pain and to reduce the patient to a state of perfect quiescence, narcotism being of course carefully avoided. It is important that the opiate be regularly exhibited, and that the dose be proportionate to the duration of the disease and to the rapidly acquired toleration of the remedy. Sustaining measures of treatment are essential, and only the most easily digested aliments or predigested foods should be administered, in small quantities and at short intervals.

Vomiting is to be checked if possible. Warm applications and revulsives to the abdomen are usually greatly conducive to the patient's comfort.

When the inflammation has been thoroughly controlled, laxative enemata and saline cathartics should be repeatedly administered, with all due caution, in order to evacuate the bowels; and great vigilance should be exercised lest the constipation almost inevitably following such an attack lead to recurrence of faecal impaction, and this in turn to repeated attacks of peritonitis. What has been said above regarding the general treatment of acute peritonitis from faecal impaction will apply to cases of peritonaeal imflammation from the other causes, the discussion of which has been assigned to the writer, with such modifications as the special conditions incident to various cases may demand.

2. *Acute peritonitis due to the extension of inflammation in enteritis; hepatitis, or inflammatory diseases of other abdominal viscera.*

It is the writer's opinion that peritonitis from these causes belongs to the first class which he has suggested, requiring treatment at first directed to the relief of the peritonitis, and subsequently to the removal of the primary disease, although in some instances measures addressed to the cure of the latter may properly go hand in hand with those directed against the peritonaeal inflammation. This remark applies with equal force to acute diffuse peritonitis following hepatitis, gastritis (whether acute, ulcerative, or phlegmonous), splenitis, and non-perforating colitis. The treatment already outlined as the typical one for peritonitis in general is applicable to those cases arising from extension of inflammation from the abdominal viscera, until the acuteness of the disease is past, when the special indications for the treatment of the primary malady should claim attention. Thus, in enteritis, remedies to soothe the intestinal mucous membrane are in order as soon as vomiting no longer contra-indicates their administration, provided that this indication has not been entirely met by the opiates employed in the treatment of the peritonitis proper. The salts of bismuth are very useful in fulfilling this indication.

If hepatitis has proved the starting-point of the peritonaeal disease, measures aiming at the disengorgement of the liver are in order. This indication may well be filled by saline purgatives—such as Carlsbad salts—and by mild mercurials. If the peritonitis has owed its origin to malignant tumors of the liver or any other abdominal organ, the treatment must aim at palliation of these diseased conditions which are not susceptible of complete relief.

If acute gastritis, or non-perforating gastric ulcer, has given rise to peritonitis, the necessary opiates may be best administered subcutaneously, and rectal alimentation may be tried until the stomach resumes its functions.

Acute peritonitis from phlegmonous or interstitial gastritis will prove fatal, and yet claims the same treatment as peritonaeal inflammation due to simple acute gastritis, the differential diagnosis between which and the phlegmonous variety is exceedingly difficult.

Peritonitis originating in splenitis and in simple colitis does not present any indications differing from those already mentioned.

Acute diffuse peritonitis incident to paludal or to exanthematic fevers, to albuminuria, scurvy, cardiac disease, rheumatism, exposure to cold and damp, or to decomposition of the intestinal contents, belongs to the writer's second class of cases, and requires treatment simultaneously directed to the relief of the aetiological conditions and of the peritonitis secondary to these.

It is probable that the special poisons of paludal and of the exanthematic fevers produce peritonitis by their irritating influence upon the peritonaeum, or by exciting eliminating efforts on the part of this membrane. It is therefore plainly indicated to remove the morbific principles upon which these diseases depend, or, failing this, to neutralise them so soon as possible, whenever therapeutic efforts tending in this direction will not aggravate the already existing peritonitis. Thus, malarial fever should be controlled by the hypodermic administration of suitable quinine preparations in adequate

doses; and in variola, rubeola, and scarlatina the indications for antipyretics and for sustaining measures should be faithfully fulfilled. Since it is desirable in these cases to spare the stomach all unnecessary effort, exceedingly high temperatures may best be combated by cold spongings, affusions, and packs, or by antipyrine carefully given by rectum or subcutaneously. Erysipelas, complicated by peritonitis, claims energetic local treatment from the beginning of the attack.

In acute diffuse peritonitis developed during the course of albuminuria, scurvy, and rheumatism, the dual indication is to assuage the local inflammation at the same time that the systemic poison is eliminated or counteracted, but the measures directed to this end do not essentially differ from those to be adopted in cases of these diseases uncomplicated by peritonitis, and it is not within the province of this paper to discuss the detailed management of these maladies. The treatment of peritonitis already outlined will not conflict with any therapeutic measures indicated for the relief of these diseases, provided that the exhibition of opiates be not carried beyond the point necessary for the complete relief of pain. In peritonitis incident to rheumatism, salicylates are indicated, but, owing to the irritability of the stomach, they should generally be given by rectum, or salol should be employed in their stead.

In peritonitis from exposure to cold and damp we must assume that the disease owes its origin to the depressing effect of these agencies upon the vitality of the peritonaeum, whereby the exciting cause of the disease is enabled successfully to attack the devitalised peritonaeal tissues. The term idiopathic would seem to be more appropriately applied to this form of peritonitis than to any other, although it is doubtful whether this expression be ever justifiable. At all events, there is in a typical case no complicating or causative disease, and could the aetiological diagnosis be made with precision, the case would be one in which the prospects of a speedy cure from laparotomy, with thorough cleansing and drainage of the peritonaeal cavity, would be flattering. Since,

however, the true causative agent must, in such a case, remain for some time a subject of conjecture, it will generally be safer to adopt the opium treatment, at least until there is a sufficient accumulation of statistical data to demonstrate the contrary proposition.

In acute diffuse peritonitis from decomposition of intestinal contents, we are again confronted by the necessity of removing the exciting cause of the peritonaeal inflammation, while relieving the latter disease. Decomposition of the intestinal contents is not likely to be carried to such an extreme degree in the small intestine as to engender inflammation, unless in cases of obstruction, which have already been ably and comprehensively discussed by our surgical confrères. This is fortunate, so far as the success of evacuating measures is concerned, since cathartics, by which alone the smaller bowel could be reached, are, as a rule, out of the question. Hot water enemata may be used, with a reasonable prospect of success, simultaneously with the opium treatment. The water should be introduced through a long, rather flexible tube, which should be carried as far into the large intestine as is possible without the employment of undue force. The paretic condition of the bowel and its consequent liability to rupture must be borne in mind, and the injections limited in quantity, so that no danger of overdistention be incurred. Should the bowel fail spontaneously to expel the fluid injected, it may be withdrawn by aspiration, the process being continued until the decomposing faecal masses are at least partly removed, and repeated if indicated by a continuation or by an aggravation of the symptoms.

QUESTION IV.

WHAT ARE THE MEANS OF DIFFERENTIAL DIAGNOSIS BETWEEN VARIOUS FORMS OF ACUTE DIFFUSE PERITONITIS, AND WHAT THE PROGNOSIS IN EACH?

By John Shrady, M.D., of New York County.

No disease more than peritonitis so impresses with a sense of its gravity. Probably no other tells so true a story, with so intuitive a sense, and in none is there so much suffering with so little expression in words. The humblest tyro need not ask many questions. There is agony, there are moans, but the complaints, so to speak, are few: the eloquence of its woe lies not in adjectives.

Perhaps a glance as giving assurance of its character may be overstatement, but this is nearly the truth. "Not quite," as Alonzo Clark was wont to say; and then in his inimitable way would he tell how "the autopsies in revealing the serum and flakes of lymph often humiliated the physicians." He for one laid much stress upon the occasionally painless feature, and added some striking examples. Pain, nevertheless, has come down to us, with the folk-lore of the profession, as the one great symptom—pain on pressure—regional pain directing to subjacent tissues.

Cullen, than whom there never was a more careful observer, hints at a very difficult diagnosis, while acknowledging the law of exceptions as having somewhat too wide a sweep; still, in the history of differentiation his statement must be pronounced as vague, not to say unsatisfactory. He gave sketches merely, and let Broussais, Bichat, Barron, Hodgkin, and Habershon fill in the picture with their more realistic tracings. And yet, to repeat, pain first arrests our attention, and then steals upon our convictions—indefinitely, and long before the warning temperature. You may have had a his-

tory of shock, perhaps a scarcely remembered shivering, remembered because the question was a leading one, and not until then was there noticed a persistent pain, while the weight of the bed-clothes oppressed, and the descent of the diaphragm aggravated the suffering. Hence, the breathing is shallow, the tone of the voice low, the speech measured, and the knees drawn up—all for the sake of relaxing muscle and relieving the tension of sensitive tissues.

In the diagnosis, the symptomatology may be in dispute because of the difficulty of eliminating the visceral inflammations and the neuralgic implications. When the malady is primary, the diagnosis is not so difficult as when mixed with secondary complications,—such as the rupture of an abscess, or the outpour of the intestinal contents into the abdominal cavity. Here, again, as the effusion increases the pain diminishes.

A word or two regarding the forms of peritonitis, and the causes which produce the disease. It may be granted at the outset that slight excitants are inoperative in the malady in question. Exhausting diseases, probably acting upon the nervous system of organic life by disturbing nutrition, the proliferation of recent connective tissue, and discharges through perforating ulcers, by assuming the office of foreign elements contribute their quota of importance. Cancer of various abdominal organs, by originating local inflammations with pocket-like diverticula of larger or smaller dimensions, all, too, have their part in the drama.

Then there is the general diffuse form of seemingly idiopathic origin, generally, however, comprehended under the loose term of a contracted cold. This in the face of the growing doctrine that the peritonaeum is most tolerant of traumatism, despite the awe with which it was approached not a score of years ago. The probable explanation of the changed opinion is a greater boldness in the surgery rather than the preventive measures of asepsis. The writer well remembers the puzzled expression worn by the late Prof. Dalton in his vivisections, when he spoke of the peculiar

resistance of the dog's peritonaeum to surgical disturbances, and discussed the immunity as owing to his lower nervous susceptibility.

More nearly, however, did the late Dr. James R. Wood voice the sentiment of his day, when, turning to his class in the pause of an operation, he said, "but, gentlemen, I always take off my hat to the peritonaeum." As has been before said, these views have undergone very marked modification: antisepsis has stimulated a greater number of operations; giving full force to the apothegm, "Nothing venture, nothing have."

Briefly, there are many points in the diagnosis as referring to other maladies. Peritonitis may be diagnosticated from hepatic colic by the latter's intensity and the violence of the pain along with the absence of elevation of temperature, always excepting subnormality as an indicator of shock. The facies Hippocratica, especially in advanced stages of its progress, is the best detector of peritonitis. In the forms of colic this beseeching expression of emaciation is absent. The other cases that may confuse may be rapidly summarised as being cirrhosis of the liver, pleuritis, pulmonary consumption, the shock from discharge of bile into the abdominal cavity by perforation of bile ducts, cancer of the liver with effusion, and cancer of the peritonaeum with a widely spread diffusion. Careful palpation and percussion are efficient means for discrimination, in which areas of dulness are to be particularly considered.

A point in diagnosis is the fact that tympanites is never absent, probably due to the accumulation of gas by reason of the arrested peristaltic action of the intestines. If the excellent definition of the late Prof. Hamilton be accepted, to wit, that shock is a temporary paresis of the nervous system, the sequences may be followed without a deal of study, and the phenomenon may prove, according to Watson, to be "defensive against worst results." Nausea, graded up to vomiting and hiccough, may be a concomitant but not by any means a constant symptom of this stage of the malady.

What else can any or all of these manifestations be but a jar in the machinery of the nervous system of organic life, running out of groove, and tending by the blind force of its motive power towards readjustment? Clearly, the jumping heart shows not its distress by pain, but by its loss of rhythm. This is likewise the case with the lungs and the stomach, both of which exhibit in all their disturbances the antagonism of their several functions.

What need is there, so far as results go, for the classification of causes on an anatomical or even pathological basis? The septic element, traumatism necessitating the employment of every resource for repair, sometimes by adhesions to form pouches for the sake of minimising the danger by limitation, and then again the distention of the closed sac, when the exudation is blander by a more abundant excretion, are factors which instruct without providing a panacea. Nature, by her usual tendency to recovery, sometimes does too much, and is not infrequently surprised by death before the work is complete. The foreign element may be degenerated pus, which in the case of the female courses through the Fallopian tubes into the peritonaeal cavity, or in either sex bursts through ulcerated Peyerian glands, blended with other products of decomposition; or, as in the case of the ruptured appendix, carries a grape seed—perhaps an insignificant cylinder of faeces compressed and hardened—through the most direct avenue of escape. The forlorn hope can only exhibit itself in the staying powers of nature. Surgery in the very nick of time may effect something; medicine can avail nothing. As Sieveking says, "Peritonitis is only the climax of nutritive changes."

There are some puzzles in the differential diagnosis, but they require not much waste of study. Besides hepatic and renal colics, colica pictonum might for a while, by reason of the intensity of the suffering, confuse, but the occupation of the patient, and the blue line of the gums when not of porcelain, speedily dispels the doubt. Corroborations are necessary, but temperature, with antecedent shock, as marked

by the tell-tale chill, is found solely in peritonitis, and is the finger-board of the cross-roads.

The prognosis is subject to many qualifications. "Largely fatal" is about the mildest verdict of the books. Statistics, in the absence of unwritten cases and autopsies, are misleading. Traumatism, perhaps, furnishes the greatest number of recoveries; cases due to sepsis, of whatever origin, most of the fatal issues. Cancer undoubtedly sends to the grave more from the gravity of the morbid changes in the organs involved than by the secondary peritonitis, which is more of a mode than a cause of death.

Two men are at present alive, one of whom supported his intestines within his hands after having been slashed by a butcher-knife, yet marvellously recovered after many weeks of a resolving peritonitis. The wounds of the other healed by first intention. A child likewise overcame a peritonitis, which was relieved by a nick of the scalpel, and the discharge of a quart of pus through the pouting umbilicus. The last certainly had five or six years of undisturbed health, and then was lost sight of in the many changes of the metropolis. When blood changes have occurred, the future may be easily predicted.

To sum up the whole matter, recoveries in all phases of the disease, whether complicated or not, are rather surprises, so that be the treatment what it may, there should be no remorses. That inscrutable force, *vis medicatrix naturae*, justifies all with a most noble generosity.

QUESTION V.

IN WHAT RESPECTS ARE THE THERAPEUTIC INDICATIONS IN ACUTE DIFFUSE PERITONITIS MODIFIED BY THE AETIOLOGICAL FACTORS?

Peritonitis from perforating gunshot wounds of the intestines.

By C. A. Leale, M. D., of New York County.

The surgeon called to treat traumatic peritonitis, where there has been a perforation of the intestines, may have such a variety of complications in the special patient under observation, that a reliance on any definite rule for his guidance would be found impracticable. We will suppose that in the class of cases to be hereafter noted, an abdominal section with a search for the lesion has been deemed unjustifiable, and the conclusion reached that the best or the only chance of saving life will be by less heroic means, with the hope that either the natural contractions of the muscular coats of the intestines may close the perforations until inflammatory adhesion ensues, or that, if when too large for this method, the injured intestine may become united to another serous surface, and thereby prevent faecal extravasation. In traumatic peritonitis we may have either a local or a circumscribed inflammation, or a general inflammation of the peritonaeum involving its entire surface.

My observations of traumatic peritonitis, and microscopic studies of the changes in the blood of the capillaries in inflammation of the web of the frog's foot, lead to the belief that we may expect several if not most of the following changes after the violence to the immediate peritonaeal tissues,—chemical changes in the injured tissues, disintegration within these chemically changed tissues, and multiplication by rapid generation of micro-organisms in the newly changed and susceptible soil.

In minute perforations of the intestines, and slight enteritis or peritonitis, such modified changes in the part may ensue that a restoration of the tissue could follow by reintegration, or the interposition of new matter, with so slight a pathological change as completely to obscure any subsequent sign of a lesion. In more severe or extensive wounds, we may have death of the immediately surrounding parts, to be followed by gangrene and a removal of the necrotic tissues by suppuration.

Or, last, we may have the death of the individual by being overwhelmed with a newly generated, poisonous chemical compound, or overcome by the exhaustion due to sustaining myriads of newly formed micro-organisms. In the former, we may have a rapid death preceded by a very high temperature, blood-poisoning, and thrombosis, as in septicaemia; while in the other, a slow death by embolism and the purulent contamination of pyaemia. Military surgery offers many more illustrations of each of these types than civil surgery, in consequence of the larger number wounded and the large projectiles used by armies, and the smaller missiles used by hunters, homicides, or suicides.

As examples of military surgery do not occur so frequently at present in our country, while the latter class is frequently met by the general practitioner throughout the land, the latter will be taken as the special theme of my remarks.

Recovery following perforation of the intestines, collapse, and peritonitis treated by opium; necropsy ten years afterward.

J. G., a middle-aged man, having tuberculous pulmonary disease, was shot by a man three feet in front of him as G. advanced up stairs to overcome his opponent. A large Smith & Wesson pistol was used. The ball entered near the right and upper border of the umbilical region, passed inward and downward, not making an exit. G. immediately felt intense lancinating pain in his abdomen, which was followed by the symptoms of general collapse. He was carried to the near-

est police station, where I made an examination, and found that the ball had passed through that portion of the peritonaeal cavity where the small intestines are located. I made the patient assume the same relative position as when he was shot, and introduced a small aseptic silver probe, which passed directly into the peritonaeal cavity, conclusively demonstrating that the ball had passed with sufficient velocity to plunge through the tough abdominal coverings. An examination of the back of the patient on a line with the probe revealed a deep-seated hard substance beneath the fascia; this was cut down upon, and I removed the bullet. I thus had presumptive evidence that the intestines had been perforated during the passage of the bullet to its place of lodgment beneath the lumbar aponeurosis. From the station-house, G. was removed to his residence, where no one excepting his wife and myself was permitted to see him. His wife was a nurse of many years' experience, and followed all my directions. After thoroughly cleansing the wounds of entrance and exit, I cut away all tissue around the wounds that gave evidence of sloughing, then drew the edges together and hermetically sealed the openings by several layers of contractile collodion; then placed him on a comfortable cot, resting on his back, with a pillow beneath his knees to relieve the distress caused by the tension of the abdominal muscles. The external wounds closed by primary union. He had intense local and severe general peritonitis with great abdominal distention. His abdomen was encircled by a large, warm flaxseed poultice, which caused him to exclaim, "Oh, how comfortable!" Opium was given in doses sufficient to check the peristaltic motion of the intestines, to control pain, and to give the necessary sleep. For two weeks he was constantly guarded, and kept on a low diet, as easy as possible, and without a passage from the bowels. In six weeks he digested ordinary food, had regular normal faecal evacuations, and was pronounced well. Seven years afterward I examined him, and found that he suffered from very slight strictures and adhesion of the intestines. G. lived for ten years after being shot, only

having had occasional colic whenever he permitted himself to become constipated, and when the hard faecal matter caused temporary obstruction as it passed through the strictures of the intestines. He willed his body to me; and after his death, assisted by Dr. Harwood, I made an examination, and found the results of old peritonitis and several places where the intestines had been perforated, and where from loss of substance their calibre had been diminished. At these points the cicatricial tissue did not present any evidence of disease, and, although he died from pulmonary tuberculosis and cirrhosis of the liver, all appearances proved that the old intestinal perforations had been entirely overcome, with the loss of about one twentieth part of the circumference of the intestine at points where the ball had perforated. In this instance, by rest, freedom from pain, and with the most easily assimilable, non-faecal forming diet, accompanied by the aid of opium, the results were attained.

QUESTION II.

DO PATHOLOGICAL AND CLINICAL CONSIDERATIONS WARRANT THE SEPARATION OF CASES OF ACUTE DIFFUSE PERITONITIS INTO DIFFERENT CLASSES, SOME INFECTIVE, OTHERS NOT SO?

QUESTION V.

IN WHAT RESPECTS ARE THE THERAPEUTIC INDICATIONS IN ACUTE DIFFUSE PERITONITIS MODIFIED BY THE AETIOLOGICAL FACTORS?

By Wm. McCollom, M. D., of Kings County.

In examining the subject of Acute Diffuse Peritonitis, I do not accept all that has been said and written.

Dr. Carroll, in his comprehensive division of the subject and in the questions propounded for discussion, has manifested discreet wisdom.

Peritonitis as at present discussed, from the stand-point of the specialist, the surgeon, and the gynaecologist, will bear criticism.

At the annual meeting of the American Medical Association, held in Washington in May last, this was the subject of a paper read before the Section of Surgery and Anatomy. The writer, with very positive opinions, says that peritonitis is practically a new field for investigation, that "idiopathic peritonitis is a myth and a delusion," and appears to be sorry for all who are not wise enough to believe it. He "marvels at the great credit men give to the opium treatment," yet he "ventures to say that if all the medical men in this city could

be asked what is the first thing they would do for a case of peritonitis, they would say, Relieve him or her of pain by opium. It is almost the universal rule, notwithstanding the stress laid on the great danger to the patient in such treatment." It may be a question whether the eleven jurymen are wrong and the twelfth one right, or not. The author of the paper states that in the last five years he has either surgically operated or assisted in 500 operations for the cure of peritonitis, "all of them so severe that life without operative treatment could not have been saved." He says "There was not one case of idiopathic peritonitis in the list, though more than one third of them had been so named by good men."

Extravagant statement and assertion weigh lightly when overbalanced by the weight of experience of the best clinical observers.

The graphic historical address by our President, delivered before the Fifth District Branch of this Association at its last annual meeting, sets forth most definitely the method of treating peritonitis with opium, as instituted by that master-mind, Dr. Alonzo Clark: the world has seldom seen his equal as a clinician.

The better part of the profession had known enough for a hundred years and more, previous to this time, to give opium for the relief of the agonising pain of peritonitis. Opium had been used to relieve pain, pain often caused by cathartics, and not so much with a belief in its curative action. Dr. Clark demonstrated that we have in opium a remedy *par excellence* for the cure of uncomplicated peritonitis. The results of the method, carefully carried out under his supervision, speak much louder than theories and unproven assertions.

The causes of peritonitis being varied, and so well understood by the learned members of this Association, I shall not enumerate them. I desire, however, to mention idiopathic peritonitis, and to claim that it really exists, notwithstanding the statement now so frequently made that it does not exist. How does one know that peritonitis is not idiopathic, when recovery takes place? In fatal cases, not puerperal or septic,

not due to traumatism, to intestinal obstruction, to apendicitis, or tuberculosis, even with pus in the peritonaeal cavity when the disease has lasted for a considerable time, may be, and I believe are often, idiopathic in origin. Simple assertion does not settle the matter that they are not. A repetition of attacks in the person would not prove the cause other than idiopathic.

By reason of organisation or peculiar idiosyncrasy some individuals are specially liable to disease of the serous membranes. Who questions that pleuritis is idiopathic? The pleura differs not in its organisation from the peritonaeum; in both, inflammation often results in serous effusion, plastic exudation, and adhesions. In an asthenic condition the pleura or peritonaeum may become a pus secreting membrane, and we have the presence of pus in the cavities,—the pleural abscess and the pelvic abscess. Pleuritis and peritonitis may be tuberculous or idiopathic in origin.

If peritonitis is frequently idiopathic, resulting, as it often does, from the sudden and severe chilling of the body when fatigued, from wet clothing and cold atmosphere, it is important to recognise the fact in the treatment of the case.

Lose no time in relieving the agonising pain, for such cases are general and not localised peritonitis, and especially painful. Fully relieve the pain, and thereby check the vomiting so very distressing to the patient. In acute general peritonitis, the whole intestinal canal is paralysed, and it is worse than useless to attempt to excite it to action by cathartics. Nature seems to hold the tissues involved in the inflammation as still as possible for a purpose: let us imitate nature in cases of this class.

If the surgeon recognises the fact that a considerable portion of cases of acute diffuse peritonitis are idiopathic, he will not open one hundred abdomens in a year on an average, or continue to publish his statistics.

When I commenced the practice of medicine, more than thirty-five years ago, in the state of Vermont, where the winter season is long and cold, and the ground covered with a

heavy body of snow which disappears rapidly in March and April, the vigourous out-door labourers are much exposed to wet feet and wet clothes from the ice-cold snow-water. As the days draw to a close, the temperature falls low, and severe colds often result in pleurisy and peritonitis. The man after such imprudent exposure is taken in the night with a severe and protracted chill followed by high temperature, great abdominal pain and tenderness on pressure, with almost constant tendency to vomiting,—in short, with typical symptoms of general peritonitis. Almost all the cases of peritonitis I had to treat in that region of country were in males, and in males accustomed to out-door labour.

Puerperal and septic peritonitis in women I rarely saw, but obstructive traumatic tubercular peritonitis, and apendicitis, mostly in the young, were occasionally observed. The greater portion of cases observed I would class as idiopathic.

I remember interestedly watching the course of a few cases of this variety of the disease while a student, treated by my preceptors after the older method, by cathartics with little or no opium. Calomel and jalap were given and repeated, and sometimes followed by croton oil. I shall never forget the terrible suffering the patients endured from the intense pain, constant nausea, and vomiting. Death usually early closed the scene.

At this time I carefully studied the method of Dr. Alonzo Clark, who was Professor of the Theory and Practice of Medicine in the Vermont Medical College, at Woodstock, Vt., where I practised medicine for twelve years; and I fully adopted the method of treating acute peritonitis—when the case was believed to be idiopathic—by opium from four to six days, without laxatives or cathartics of any kind, and then the bowels were acted upon by enemata, the injection made slowly of warm olive oil in quantity as large as the intestine would retain for several hours, and repeated from time to time as recommended by some physician many years ago. I have repeatedly found this an efficient method of unloading the bowels of faecal matter without much peristaltic action.

I had the satisfaction of making my patients comfortable, and seeing almost all recover.

In vigourous men I have seen copious venesection of great benefit in the early stage.

Peritonitis from different causes may require different management. Septic peritonitis seems to be favourably influenced by saline laxatives, but I believe that purgatives may be productive of great evil.

In Watson's incomparable lectures on the Principles and Practice of Physic, published about forty years ago, he states,— "Most writers recommend purgatives as highly servicable in peritonitis: I do not think the good which they are calculated to do as antiphlogistic remedies can at all be put in comparison with the harm that I am persuaded they may produce by increasing the peristaltic action of the intestines, and so causing additional friction and tension of the inflamed membrane." He taught that it was much better to restrain than to excite intestinal action. He cites the successful experience of Mr. Bates and Dr. Wm. Stokes and Dr. Graves with the free use of opium without purgatives, and notes a fact I have more than once observed, that after the most signal improvement under the opium treatment and the symptoms of peritonaeal inflammation had completely subsided, the opium was omitted, and saline laxatives given, followed by evacuations and immediate return of the peritonitis.

I have learned from experience of the danger of a too early use of laxatives in convalescence from acute peritonitis. Watson in England and Clark in New York pursued the study of the treatment of the disease, collected facts from the experience of other careful and able observers, and came to the conclusion that opium is the most important remedy in this disease, and that purgatives and laxatives should be avoided, at least during active inflammation. They became convinced that the results of this plan of management were much better than under the older treatment by laxatives and purgatives, without opium to its fuller influence.

Progressive physicians soon adopted the practice, and it has been *the* practice for nearly forty years.

Let us hesitate about accepting the teachings of the few, who would carry us back to the long ago,—to the free use of laxatives and the avoidance of opium, a practice tried many years and found inefficient.

QUESTION V.

IN WHAT RESPECTS ARE THE THERAPEUTIC INDICATIONS IN ACUTE DIFFUSE PERITONITIS MODIFIED BY THE AETIOLOGICAL FACTORS?

Peritonitis in early life.

By J. Lewis Smith, M. D., of New York County.

No age is exempt from peritonitis. The late Sir James Y. Simpson in 1838 published a monograph, in which he presented facts to show that the foetus sometimes becomes nonviable and perishes in consequence of peritonitis, and that the cause of the inflammation is commonly inherited syphilis.[1] Owen,[2] Kirchner,[3] and Ballantine[4] report cases of foetal peritonitis. The occurrence of peritonitis during foetal life is indicated by the presence of adhesions and bands between the intestinal loops, and thickening and opacity of the peritonaeum. Foetal peritonitis is fatal before birth, or, if the child be born alive, death usually soon results, the peritonaeum, with its bands and adhesions, being in a state incompatible with life. In Ballantine's case, the birth of the child was normal, but tedious. It did not present any marked evidences of disease, but died thirty-two hours after birth. Its intestines were found distended by fluid meconium and foetid gas, and the lesions of a dry peritonitis were found in the abdomen and pelvis.

Bauer says,—"In some cases, in which peritonitis intrauterina was discovered as the cause of death of the foetus, an unusual increase in the movements of the child, and their sudden cessation, had been observed." Those born alive are,

[1] Edin. Med. and Surg. Jour., 1838.
[2] Brit. Med. Jour., 1885.
[3] 1886.
[4] Edin. Med. Jour., March, 1890.

at least in some instances, much emaciated, with abdomens distended and tender, the skin icteric, and their extremities perhaps oedematous.

Dohrn[1] states that an infant died at the age of eight days from peritonitis beginning before birth, and the discharge of meconium was prevented by adhesions which had formed. Although syphilis is the common cause of foetal peritonitis, it appears that other causes are occasionally operative, as in a case of perforative peritonitis observed by Breslau.

A very interesting and fatal form of peritonitis is that occurring in the newly born, and it is not uncommon in degraded and filthy families, who have no knowledge or thought of sanitary requirements. It has in times past been quite common in maternity wards, but is now comparatively infrequent in them on account of the employment of antiseptic measures in the treatment of the newly born. The statistics of Bednar relating to peritonitis of the newly born infant, published in his monograph entitled Krankheiten der Neugeb.,[2] embrace 165 cases. Of these, 102 occurred within the first two weeks of life; 63 in the third and fourth weeks or later; 15 were over the age of one month, 4 over two months, 1 four months, and 1 five months.

Aetiology.—Peritonitis in the newly born is commonly caused by septic matter, which enters the system at the umbilicus from foul umbilical dressings, foul water employed in washing, foul fingers of the nurse, or from other sources. Microbes are believed to be the pathogenic factor. Umbilical inflammation, with perhaps ulceration and the formation of a phlegmon may first occur, and septic matter is taken up by the umbilical lymphatics or blood-vessels, and carried into the system.

The following case occurred in the New York Infant Asylum:

Lizzie C——, born September 21, 1887, robust, weighing eight pounds, seemed well, taking the breast and having normal evacuations until Sep-

[1] 1868.
[2] Wien, 1880.

tember 28, when she became restless and refused the breast. Her rectal temperature was 101.4°, and her respiration was accelerated and accompanied by an expiratory moan. September 20, temperature 103.6°, respiration accelerated and painful, and abdomen distended; no cough. The diagnosis of septic peritonitis was made, but the umbilicus was of normal appearance, and the desiccation and fall of the cord seemed normal. The elevation of temperature even to 104.4°, the distention of abdomen, and the hurried respiration with expiratory moan continued until death, which occurred September 30.

At the autopsy three ounces of sero-purulent liquid containing flakes of fibrin escaped from the peritonaeal cavity, and all the abdominal organs were covered by a fibrinous exudation, the intestines being matted together by it. The umbilical vein was pervious; it contained clots of blood and dirty-looking pus, but the umbilicus was apparently normal. A segment of the aortic valve was thickened and rigid, and attached to it was a fibrinous mass. The appearance indicated an endocarditis of slight extent. Under the microscope the walls of the umbilical vein presented their normal appearance, but its dirty-looking and disintegrating contents probably contained septic matter. The hepatic cells exhibited the peculiar cloudiness observed in protracted febrile diseases, otherwise the organs seemed healthy. In this case the mother remained well.

Peritonitis sometimes results from septic infection, when the conditions are favourable for its occurrence, in older children as well as in the newly born.

Idiopathic Peritonitis.—Occasionally peritonitis occurs without any antecedent disease which might give rise to it, and, as no cause can be discovered, it is designated as primary or idiopathic. Some recent authors deny that peritonitis ever occurs as a primary disease, but that there is such a malady and not very infrequent, is, I think, easy of demonstration.

At the meeting of the Clinical Society of London, November 13, 1885, Dr. Samuel West related the case of a girl of ten years, who, after a wetting, was suddenly seized with intense abdominal pain accompanied by vomiting, symptoms which continued and were present four days later. When Dr. West examined the patient, she had had no stool in four days, had vomiting of yellow and acid, not faecal, substance; great abdominal distention, pain and tenderness, a little fulness in both iliac regions; skin hot and dry, temperature

99.8°, pulse 100, respiration 28. Opium and poultices were prescribed, and two days later laparotomy was performed, followed by death in six hours. At the autopsy no cause of the peritonitis could be discovered, and the disease was regarded by Dr. West and the other members of the Clinical Society as idiopathic.

In the discussion which followed the narration of this case, Dr. West related another case of supposed idiopathic peritonitis, Dr. Goodhart related one, Dr. Hilton Fagge had seen two cases. W. Morrant Baker also related the case of a boy of fifteen years, admitted into St. Bartholomew's hospital. He had frequent vomiting; no stool in five or six days. The vomited matter was offensive, but not distinctly faecal; the abdomen was tender and tense, and the temperature was subnormal. As he was supposed to have some form of intestinal obstruction, his abdomen was opened in the median line; a large quantity of offensive pus escaped, the cavity was washed out with a solution of permanganate of potassium, but death occurred in five hours. The autopsy revealed a general peritonitis, but without perforation or any lesion which could sustain a causal relation to the inflammation.

Dr. Charles West, in continuing the discussion, remarked that peritonitis in children without apparent cause is not rare, but as a rule it is not purulent. In two instances he had treated idiopathic purulent peritonitis, which discharged at the umbilicus, and one recovered. He believed that the disease sometimes resulted from taking cold.

The president of the Clinical Society, Dr. Thomas Bryant, admitted that primary peritonitis is possible, but he stated that cases passed as such in which local causes could be found by a more careful examination.

The British *Medical Journal*[1] gives the history of a child of three years, that died on the third day from what seemed to be idiopathic peritonitis.

The patient had good general health, but was under treatment by Dr. Althaus for infantile paralysis. The morning of March 22 was warm,

[1] Vol. I, p. 547, 1870.

but in the afternoon a sudden and great fall of temperature occurred, with a storm of sleet from the north-east. Early in the following morning, vomiting, abdominal pain, a rapid pulse (150), and a hurried, jerking respiration announced a general peritonitis, which was fatal on March 25. At the autopsy the abdominal cavity was found to contain thick yellow pus; the intestinal loops were slightly adherent. Pus occupied the pelvic cavity, the depressions alongside the ascending and descending colon, and the inflammation extended to the upper part of the abdominal cavity over the diaphragmatic surface of the liver. Since no local cause of the inflammation could be discovered, it was regarded as idiopathic, the result of the sudden change in the weather from warm to cold on March 22.

The late Prof. Austin Flint, never excelled in this country as a clinical observer, regarded taking cold as an occasional cause of peritonitis. He had witnessed its occurrence in labourers who were obliged to stand while at work in water during the cold months.

A severe and nearly fatal attack of peritonitis occurred in my own person at the age of twelve years, apparently contracted by exposure at break of day to a heavy dew when engaged in farm work. The disease itself was nearly fatal from the intensity of the inflammation, and two months subsequently the passage of a loop of intestine under a fibrinous band was nearly fatal. There cannot, therefore, I think, be any reasonable doubt that peritonitis in the child, like nephritis, is occasionally idiopathic, resulting from taking cold.

Peritonitis occurs in infancy and childhood from a considerable number of causes. It sometimes results from septic infection, when the conditions are favourable for it, in older children as well as in the newly born. The not infrequent occurrence of peritonitis in connection with erysipelas has long been known. In Heberden's Epitome Morborum Puerilium the anatomical character of erysipelas as it affects the peritonaeum is expressed in one sentence: "When the body has been opened after death, the intestines have been found glued together and covered with coagulable lymph." Since Heberden's time, nearly all who have written on diseases of infancy and childhood have mentioned peritonitis as one of the most common complications of erysipelas. Underwood says,—

"Upon examining several bodies after death, the contents of the abdomen have frequently been found glued together and their surface covered with inflammatory exudation, exactly similar to that of women who have died with puerperal fever." Similar remarks in reference to the frequency of peritonitis in erysipelatous patients are made by recent writers. We infer from cases like the following, that the specific principle of erysipelas, to wit, the streptococcus erysipelatos, which occurs in the lymph and blood-vessels of the skin in erysipelas, in some instances penetrates to the peritonaeum and causes its inflammation, without the occurrence of dermatitis. The British *Medical Journal*,[1] reprints the following cases from a continental journal:

A servant in a family had facial erysipelas. Five weeks subsequently a young lady of the family died of peritonitis, after a sickness of thirty-six hours. Soon after, a brother took erysipelas of the arm; and a fortnight later another sister died of peritonitis, continuing less than two days. At the autopsy of the last patient no local cause of the peritonitis could be discovered. The same journal, for September 19, 1885, published another series of cases showing the causal relation of erysipelas to peritonitis.

Recently, a considerable number of cases have been published showing the microbic origin of peritonitis in certain instances. Froelich states that a soldier had lacunar tonsillitis, followed by peritonitis and death. During the autopsy he wounded his finger; this swelled, as well as the axillary glands, and his tonsils also became inflamed. His wife then developed the same tonsillitis; as did also a helper at the autopsy, who pricked his thumb with a needle.[2] Froelich believes that the same micro-organism which caused the tonsillitis, caused also the peritonitis. The late Dr. C. H. Fagge states that in 1874 several children of a school at Wandsworth had acute peritonitis simultaneously. Dr. Anstie investigated the cases, and concluded that they originated from exposure to the sewer gas. The microbic and infectious nature of the peritonitis in this epidemic was ren-

[1] August 29, 1885.
[2] Deutsche Med. Zeit. 1887.

dered apparent by the sad fate of Dr. Anstie. He pricked his finger in making an autopsy of one of the cases, and death occurred from the intense inflammation that followed. Fagge also relates a case of fatal peritonitis in a female patient who had been exposed during the two or three preceding weeks to sewage from an obstructed drain, the sewage being spread over the yard and passage-way leading to her room. The offensive effluvium arising from it probably contained pathogenic microbes, which infested the air which she breathed, as well as her food.

Like as pleurisy results from disease of the lungs which the pleura covers, so peritonitis, in children as well as in adults, sometimes results from disease of the abdominal viscera. Occurring from such a cause, the inflammation of the peritonaeum begins in that portion covering the diseased viscus, and is usually limited to it; but it may extend and become general. Many examples are on record of the extension of inflammation from the abdominal viscera to the peritonaeum. Syphilitic inflammation of the liver or other organ, and new growths of various kinds—as gummy tumors or sarcoma—cropping out upon the visceral surface and distending the peritonaeum, usually cause a localised peritonitis. In ill nourished and scrofulous children, inflamma tion and cheesy degeneration of the mesenteric glands sometimes cause inflammation in the portion of the peritonaeum which covers them, and crumbling cheesy glands discharging into the peritonaeal cavity may cause a diffuse peritonitis.

But peritonitis in infancy and childhood more frequently results from disease of the hollow organs than from that of the solid viscera. Intussusception, attended by bloody stools, tenesmus, vomiting, abdominal tenderness, and the occurrence of an abdominal tumor, is more common in infancy, after the age of five months, than in any other period of life. If not soon reduced, either by inflation with air or gas, or by large and repeated enemata of warm water followed by kneading, a localised peritonitis is likely to occur around the incarcerated mass.

Another, unfortunately not infrequent, cause of peritonitis is appendicitis, due to the lodgment of a foreign substance in the appendix, or to the impaction of faecal matter forming a concretion. In a similar manner, typhlitis, due to the impaction of faecal matter in the caecum, may by extension cause peritonitis. Inflammation of the caecum and appendix is rare in young infants, since their diet is chiefly milk with farinaceous food, and its frequency in older children is due largely to the fact that they are allowed to eat freely the various fruits of the market, and are not warned of the danger of swallowing the seeds. The peritonaeum forms the external covering of the caecum and appendix, so that typhlitis or appendicitis, when severe and extending to all the coats of the intestines, necessarily gives rise to a localised peritonitis. An ulcer in the appendix, produced by a faecal concretion or foreign substance, is likely to cause a localised peritonitis. The peritonitis resulting from the rupture of the base or walls of the ulcer is one of the most fatal forms of this inflammation.

Children, less frequently than adults, have ulceration of Peyer's patches in typhoid fever; but it sometimes occurs, ending in perforation or rupture and fatal peritonitis.

In a fatal case of typhoid fever under my observation in one of our institutions, the ulceration of one of Peyer's patches had extended nearly or quite to the peritonaeum without perforating it. Nevertheless a fibrinous exudation had occurred upon the peritonaeum over one of Peyer's patches. Murchison presented to the London Pathological Society, February 20, 1866, specimens from a boy of fourteen years who died from peritonitis consequent on a perforation.

Traumatism.—A boy of my acquaintance, engaging in a rough play, received a severe blow over his distended bladder from the knee of a comrade. He was immediately seized with severe pain due to rupture of the bladder, and speedily succumbed to a general peritonitis.

Curling relates a case of fatal diffuse peritonitis, resulting from the bruise of a testicle, which was retained in the

abdominal ring. Rilliet and Barthez state that peritonitis has in some instances resulted from blows received upon the abdomen. It occurred in a fatal form from paracentesis performed for the purpose of evacuating liquid in the peritonaeal cavity. A case of fatal peritonitis following tapping for a congenital hydrocele is related in the London *Lancet*.[1] There were five communications between the hydrocele sac and the general peritonaeal cavity.

Cases have been reported of peritonitis in girls, resulting from gonorrhoea; the inflammation passing from the vagina into the uterus and through the Fallopian tube to the peritonaeum. Thus, Dr. S. Loven reports the case of a girl of five years, who in some unknown way contracted an intense vulvo-vaginitis. From May 6 to May 28, when she died, an intense general peritonitis had occurred by extension through the Fallopian tube, and was the cause of death. The autopsy showed that the peritonitis was general, intense, and suppurative.

In the London *Lancet*,[1] Mr. Murray reports three cases of peritonitis in India. The inflammation resulted from a circular and ring-like perforation in the intestine. He believes that the perforation was produced by the common round worm. But the ascaris lumbricoides has no penetrating apparatus, so that we would look elsewhere for the cause of the ulcer. But perhaps the pressure of the worm against the fundus of the ulcer may have ruptured it. Round, perforating, gastric or intestinal ulcers, due to haemorrhagic infarctions, are very rare in childhood in this country, but if they do occur, of course the secretions and faecal substance, escaping into the peritonaeal cavity, would cause intense peritonitis, as in the adult.

Tubercular peritonitis much more frequently occurs in infancy and childhood than in adult life, since in the phthisical child, especially under the age of five years, tubercles, which excite the inflammation, occur much more frequently

[1] December 6, 1884.
[1] September 1, 1888.

in or upon the abdominal viscera than in adult cases. I have published statistics showing this.

Symptoms.—Peritonitis, when due to a preëxisting disease, is, of course, accompanied by the symptoms of that disease, by which it may be rendered more or less obscure. It sometimes begins in a gradual manner, abdominal soreness, increased by pressure or forcible movement of the abdominal muscles, as in coughing, preceding the pain a day or two and gradually increasing. In other cases, peritonitis begins abruptly, and is sometimes ushered in by a chill. Constant pain, increased by movements of the body or by pressure, is the distinctive symptom, occurring in localised peritonitis at the seat of the inflammation, but in diffuse peritonitis, beginning at some point and gradually extending over the abdomen. Tenderness on pressure is seldom absent, and the pain, intensified by coughing or a full inspiration, is in most cases considerable in the beginning, but it gradually abates under correct treatment. The pain and soreness are usually greatest in the lower half of the abdomen. They are, as our remarks imply, symptoms of much diagnostic value. The extension of the inflammation over the intestines produces paralysis of their muscular layer, so that they become distended with gas.

In general peritonitis, the meteorism presses upward the diaphragm so that the body of this muscle occupies a higher site than in health. In severe cases, this upward displacement of the diaphragm, and the pain consequent on inspiration, prevent full inflation of the lower lobes of both lungs. Hence the percussion sound over these lobes may be dull, and the respiratory sound in them feeble and approaching the bronchial character. In cases of great abdominal distention the apex of the heart is carried upward, the liver and spleen are pressed upward and backward, and the distended transverse colon, or portions of the duodenum or jejunum, may lie in front of them, so that the normal dulness on percussion over these organs is replaced by the tympanitic resonance.

The percussion sound over the effused liquid is of course dull, and as the patient commonly lies on the back and the liquid gravitates to depending parts of the abdomen, the dull, percussion sound is most marked over the lumbar, inguinal, and hypogastric regions. A change of position obviously changes the location of the dulness. In some instances, in which the liquid exudation is small, the resonance on percussion is tympanitic over every part of the abdomen. In exceptional instances, it is said that an occasional friction sound can be heard in the abdomen by applying the ear or stethoscope, resembling in some instances the creaking of leather, and, in other instances, emphysematous crepitation. The patient is quiet, on account of the pain, lying upon the back, or occasionally upon one side, with his thighs flexed to relieve the tension; but the position is not uniform. The lower extremities may exceptionally even be extended.

During the acute period of the inflammation, constipation is present. It is attributed to the paralysis of the muscular coat of the intestines. When the inflammation is severe, several days, even a week or more, elapses between the stools. In the declining stage of the peritonitis, diarrhoea may supervene. In some of the reported cases the constipation has been so great that intestinal obstruction has been suspected.

Vomiting is a common and painful symptom, which the patient vainly endeavours to repress. The matter vomited consists of the food, mucus, and sometimes bile, which imparts a green colour to the substance ejected. In advanced cases, attended with marked prostration, this symptom is rather a regurgitation than vomiting. Thirst is a common symptom, the patient craving ice or cool drinks, which are vomited soon after they are taken. Before the stage of collapse, as in other inflammations, the temperature is usually elevated, but the degree of fever varies greatly in different patients, and even in different stages of the same case, when not influenced by treatment.

Bauer stated, in Ziemssen's Encyclopaedia, that "many

cases run their course from the outset without rise in temperature;" and Dr. W. W. Johnston writes in Sajous' Annual for 1890,—"In a fatal case, seen by me, due to perforating appendicitis, there was no fever, although the patient lived six days."

The pulse is accelerated: it is in some cases very frequent, as well as feeble. Before the days of clinical thermometry, a small, frequent, and hard pulse was regarded as one of the most important diagnostic signs. The countenance is anxious, but the mind is clear; or at times there is mild delirium, the speech being incoherent and rambling. A pallid and pinched countenance indicates a grave form of the disease, and approaching collapse. Retention of urine is common, due to paralysis of the muscular coat of the bladder when the inflammation extends over this organ. It is due in part to paralysis of the abdominal muscles, and to the pain of micturition, which induces the patient to resist the desire to urinate. In some cases it may be necessary to employ the catheter. The liquid ingesta being to a great extent vomited, the urine is usually scanty. It frequently contains urates, and in some instances a trace of albumen.

In fatal cases, which, as we will see in our remarks on prognosis, are unfortunately more common than favourable cases, death occurs from asthenia or collapse, usually towards the close of the first week or in the second week. In favourable cases the symptoms gradually abate, the vomiting ceases, the pulse becomes less frequent, the temperature falls, the bowels, previously torpid, occasionally move without the assistance of the clyster, and the appetite begins to return. Peritonitis occurring in tuberculosis, usually assumes the chronic form, and in rare instances, when not due to tuberculosis, it becomes chronic with an uncertain result.

Pathological Anatomy.—In localised peritonitis, the action of the cause, as the name implies, is limited to a portion of the peritonaeum. In acute diffuse, or, as it is sometimes designated, general peritonitis, the inflammation commonly begins at one point, but it rapidly extends over the peritonaeum.

The lesions vary greatly, both as regards their extent and the nature of the inflammatory products. The initial lesion is hyperaemia of the peritonaeum, attended often by ecchymotic points. When the inflammation is fully developed, the hyperaemia varies considerably in different parts of the peritonaeal surface, but is usually most marked at and around the point of commencement.

The peritonaeum loses its lustre, its epithelium is more or less detached, and soon a thin film of exuded fibrin appears, containing in its interstices epithelial cells and an occasional pus cell. As the inflammation progresses, the fibrin, increasing in amount, unites the loops of intestines to each other, to the other viscera, and to the abdominal parietes. The epithelial cells become swollen, granular, undergo division, and are readily detached, so that where the inflammation is intense, the peritonaeum is to a considerable extent denuded of epithelium. As in other serous inflammations, serum is also exuded, in which fibrinous flacculi and the cellular elements float. If pus cells predominate, so as to give a turbid or milky appearance to the liquid, the peritonitis is designated suppurative or purulent. The subperitonaeal connective tissue is also swollen, and infiltrated with cells, especially along the course of the vessels. The connective tissue corpuscles also participate in the inflammation. In severe cases the inflammation is not limited to the intestinal peritoneum, but it extends to the muscular, and even to the mucous, coats of the intestines, so that they become hyperaemic and swollen.

The relative proportion of the different inflammatory products varies greatly in different cases. In all cases, I believe, not only are serum and fibrin present, but pus corpuscles can be detected under the microscope. If the exudation consist chiefly of fibrin, the peritonitis is designated fibrinous, adhesive, or dry. If it consist chiefly of serum and fibrin, it is designated sero-fibrinous, and we have already stated what cases it is proper to designate by the term suppurative or purulent. In patients who were in good health when the peritonitis began, and who through its course do not suffer

from infection of any kind, the inflammation is usually fibrinous or sero-fibrinous. Peritonitis, due to perforation or traumatism, is often purulent; and that due to septic processes or infectious diseases is commonly so. The pus is sometimes encapsulated, or limited to a portion of the peritonaeal cavity, even when the peritonitis is diffuse. The exudation occasionally has a reddish tinge, from extravasation of blood.

The connective tissue underlying the peritonaeum undergoes proliferation, producing granulations which rise above the level of the peritonaeum. These granulations contain newly formed blood-vessels, from which blood may escape by attrition, and which aid in absorbing the effused liquid in the declining stage of the inflammation. The granulations upon opposite surfaces coming in contact may unite, forming what has been designated "connective tissue adhesion," which is likely to be permanent. The adhesions, if considerable, obviously restrain the vermicular and peristaltic movements. Sometimes, when no strangulation occurs, the bands of newly formed connective tissue so bind the intestines, and restrain their movements, that habitual constipation results. I have elsewhere related a case of habitual constipation, notwithstanding the remedies employed, produced by the adhesions and bands occurring in a child from tubercular peritonitis. Sooner or later a loop of intestine is liable to become incarcerated under a fibrinous band or an adhesion, producing the most intense suffering, and if continuing, sloughing of the imprisoned portion, and death. In my own person, after recovering from the peritonitis at the age of twelve years, a drawing sensation was often experienced in the centre of the abdomen, during the subsequent weeks; and six or eight weeks after the abatement of the inflammation a constant and most intense pain, like that from strangulated hernia, suddenly began at the point in the abdomen where the drawing sensation had been experienced. After about eighteen hours, when death seemed imminent from the intensity of the pain, it suddenly ceased, probably from the giving way or stretching of the adhesions, and liberation of the incarcerated

loop of intestine. No drawing sensation, or other symptom resulting from the peritonitis, has since been experienced.

When death occurs at the usual period,—that is, towards the close of the first week, or in the second week,—we find the peritonaeum and subperitonaeal connective tissue oedematous. The peritonaeum, denuded of its fibrinous exudation, is soft and flabby, of a dull red colour, with haemorrhagic points. The peritonaeal covering of the intestines and the mucous coat being softened, are readily detached. Pus very seldom, if ever, collects in any considerable quantity underneath the peritonaeum, so as to produce an abscess, even in the worst forms of suppurative peritonitis. There may be a large effusion of pus in the peritonaeal cavity, and it may collect underneath adherent loops of intestine, so as to resemble an abscess, but on examination it will be found to be within the peritonaeal cavity. If an abscess be without the peritonaeum, it probably antedated the peritonitis, and was, perhaps, the cause of it.

The fibrinous exudation upon the peritonaeal surface occurs either in patches, or continuously over a considerable part of the visceral peritonaeum. It is prone to form a covering of considerable thickness over the large and immovable solid organs, as the spleen, kidneys, liver, and uterus. In purulent peritonitis, pus, being heavier than the serum, gravitates to the lowest part of the abdominal cavity. It therefore occurs in greatest amount in the pelvis, and the posterior and inferior parts of the abdomen.

In cases that recover, the serum is first absorbed, and the fibrin and pus cells undergo fatty degeneration, become granular, liquefy, and are absorbed. Sometimes collections of pus become encapsulated, and may remain a considerable time without producing any marked symptoms; finally, perhaps on some sudden movement of the body, the capsule breaks, the pus is released, a new and intense peritonitis is excited, and the patient speedily perishes. Another result occasionally occurs: the pus, after the absorption of its liquid element, being a semi-solid mass, gradually undergoes caseation, and,

like cheesy substance in other parts of the system, it furnishes the nidus which is favourable for the development of the tubercle bacillus. Another occasional result is calcification,—the pus, so far as this change occurs, becoming an inert mass.

Diagnosis.—This is not difficult in ordinary cases, but if the characteristic symptoms are absent, feebly manifested, or are obscured by other symptoms, a mistaken diagnosis is not uncommon in the first days of the disease. Peritonitis is distinguished from enteritis or entero-colitis, by the greater tenderness and pain, the constipation, the contraction of the abdominal muscles in the first days, the meteorism, and, in typical cases, the general aspect of a more severe disease. Peritonitis is distinguished from colic or acute indigestion by the continuousness of the pain, the tenderness, abdominal distention, fever, accelerated pulse, and anorexia. The progressive loss of flesh and strength, the flexed state of the thighs, and increase of pain by a deep inspiration, by coughing, or by movements of the body, are important diagnostic symptoms. They enable us to distinguish peritonitis from rheumatism, and from hyperaesthesia of the abdominal walls. In the *Medical News*,[1] Tyson states that he has observed cases of rheumatism in which the pain and tenderness of the abdominal muscles so closely resembled those of peritonitis that there was great liability to a mistaken diagnosis. The symptoms in abdominal rheumatism yield readily to doses of salicylate of sodium. In the *Medical Record*,[2] Packard states that a boy had frequent vomiting, with severe abdominal pain, quick pulse, high temperature, and a tender and hard abdomen,—such symptoms as are characteristic of peritonitis; suddenly the vomiting and abdominal symptoms entirely ceased, and immediately severe pain commenced in a knee joint, and this joint presented the characteristic signs of rheumatic inflammation. In this case, and in similar cases which have been reported, in which the abdominal preceded the articular symptoms, the diagnosis of rheumatism is estab-

[1] Dec. 8, 1888.
[2] Dec. 29, 1888.

lished by the course of the disease and the prominence of the affection of the joints.

Hyperaesthesia of the abdominal walls is common in the commencement of febrile diseases in childhood, and the pain to which it gives rise on pressure resembles that of peritonitis, but it is distinguished from it by the fact that it ceases or becomes less by continued firm pressure, and the same expressions of pain are elicited by pressure on the chest or the inner aspect of the thighs. In peritonitis the pain is proportionate to the degree of pressure.

The physical signs sometimes aid in diagnosis. The presence of a liquid in the abdomen may be determined by percussion and palpation, its position varying in the abdominal cavity according to the position of the child. I have never in the child observed the friction sound which in adult cases has sometimes been heard, especially in the region of the liver. Exceptionally, as in other forms of serous inflammation, the local symptoms, as pain and tenderness, are so slight that they may not attract attention. The late Dr. C. H. Fagge, of London, stated that he had repeatedly found the lesions of general peritonitis in those who had died after severe operations, as for hernia, when the attending surgeons had failed to detect any evidence of its presence, and in cases in which the mind remained clear until death. Fagge also expresses the opinion that in most cases of peritonitis complicating Bright's disease, its presence is first ascertained on the post-mortem table, and that in all forms of latent peritonitis the effused liquid is commonly pure pus,—a fact of which the attending physicians should be fully aware, lest they believe that the disease is abating when death is near. In such cases the appetite is poor, the pulse frequent and feeble, loss of flesh and strength continues, and the distention of the abdomen does not entirely disappear. The diagnosis is made by a careful examination of the constitutional as well as local symptoms, and the history of the case.

In any case of peritonitis its cause should, so far as possible, be ascertained. If it occur in or soon after typhoid fever, it

is attributable to ulceration of one or more of Peyer's patches; if it occur in a tubercular patient, the presence of tubercular lesions in the abdomen, or irritation produced by the tubercle bacillus, is the cause. If the initial pain be referred to the right lumbar or inguinal region—where, indeed, peritonitis begins in a considerable proportion of cases in childhood—it probably results from appendicitis, with ulceration or perforation of the appendix. If the peritonitis be immediately preceded by a severe injury, traumatism is the causal agent; intussusception should be diagnosticated as the cause if the patient be an infant, if the constipation be obstinate, and the stools consist entirely of mucus and blood, and are attended with tenesmus and perhaps vomiting; the diagnosis of intussusception is rendered more certain if a small tumor be felt deeply seated in the abdomen. Perforation of the stomach, gall bladder, bile duct, or ureter, which occasionally occurs in the adult from a calculus or other cause, or ulceration or perforation of the intestine without the presence of typhoid fever or tuberculosis, is so rare in children, if indeed it ever occur, that it need not be considered in studying the aetiology of peritonitis in infancy and childhood. If there be no appreciable local cause, and the patient have been exposed to cold, we are justified in considering this exposure as the causal agent.

Prognosis.—Peritonitis in children is always a grave disease. In most instances its progress is rapid towards a fatal termination. Its gravity depends largely on its cause and extent. Death occurs from asthenia. Those cases are least amenable to treatment, and are, according to my experience, almost necessarily fatal, in which the inflammation is not only diffuse or general, but in which the undigested or slightly digested character of the stools renders it probable that the inflammation has extended to the mucous membrane of the intestines and perhaps of the stomach, so that the digestion is inadequate to the wants of the system. Thus, in a recent case in which the tenderness and swelling were removed after three weeks by cold applications and opium, and the temper-

ature was reduced to 99.5° in the morning and 101° or 101.5° in the evening, the repugnance to food was constant, and the little peptonised milk which the patient was induced to take appeared undigested in the stools, which were thin like milk and of a dirty white colour. This substance, examined microscopically by Prof. Prudden, was found to contain much granular matter, and apparently broken and disintegrating cellular elements. The patient lived eight weeks without any change in the character of the stools; the emaciation and weakness gradually increasing on account of the small amount of peptonised food which the patient was induced to take, and the apparently nearly complete arrest of digestion.

Peritonitis, occurring in the newly born from sepsis, or at any age as a complication of an infectious disease, as scarlet-fever or nephritis, is commonly purulent and fatal. Increase in the tenderness, distention, and hardness of the abdomen, and in the rapidity of the pulse, even with falling temperature, are unfavourable prognostic signs. Continued anorexia, with occasional vomiting and progressive loss of flesh and strength, is also prognostic of an unfavourable ending.

General peritonitis, resulting from perforation, rupture, or severe injury of one of the hollow viscera, is, as a rule, speedily fatal. On the other hand, if the inflammation remain circumscribed, limited to a part of the abdominal cavity by adhesions, the prognosis is much more favourable. Gradual subsidence of the pain, tenderness, swelling, and fever, diminished frequency of pulse, abatement of nausea and improvement of appetite, are symptoms which encourage the hope of a favourable termination. A weak and rapid pulse, cold extremities, sunken countenance, progressive emaciation and feebleness, and inability to receive and digest food except in the smallest quantity, indicate the near approach of death, even when the tenderness, meteorism, and fever are less than previously.

Sometimes, when the disease appears to be progressing favourably and the symptoms are abating, a sudden aggravation of the case occurs, perhaps from the giving way of

the adhesions which surrounded the inflammatory products, perhaps pus, and the peritonitis becomes more extensive and severe, and death results. Occasionally, after the severe symptoms have in a measure abated and the temperature is nearly normal, the peritonitis assumes a chronic form, continuing several weeks, and ending in death from asthenia or a slow convalescence. Even after apparent complete recovery, we should warn the patient and friends of a possible danger in the future. Adhesions may form which are permanent, and months or years subsequently a loop of intestine becomes incàrcerated underneath, with a fatal result like that from strangulated hernia, unless laparotomy be promptly performed and the incarcerated intestine be released by the knife.

In my own person, however, as I have stated, the adhesions gave way without the aid of surgery. I have, during the last twelve months, met two cases of strangulation of the intestine occurring in the manner stated, and in both instances several years after the peritonitis. Another danger in the future may arise from a pocket of pus, surrounded by adhesions remaining from the inflammation, and which at some subsequent time gives way, so that the pus escapes into the general peritonaeal cavity, producing a severe and fatal peritonitis. A distinguished physician and sanitarian of New York city died, I am informed, a few years since, in this manner.

Prophylaxis.—Something may be done to prevent peritonitis in children, although little attention has heretofore been given to this matter. Even foetal peritonitis in the future may be prevented, if the parents, warned by its occurrence in one instance, employ for themselves the so called mixed treatment by mercury and iodide of potassium. Septic peritonitis of the new born may also be, to a great extent, prevented by cleanliness of the mother and nurse, the use of disinfectant washes upon their hands, and of a disinfectant powder, like aristol, in the dressing of the navel. The peritonitis occurring in the course of an infectious disease, like

scarlet-fever, and due probably to microbic agency, may, I think, to a certain extent, be prevented by the constant use of a germicide vapour in the room occupied by the patient. In infants between the ages of five and eighteen months the most common cause of peritonitis is intussusception, the peritonitis being localised around the invaginated mass. Probably, in the average, I meet one to two cases of infantile intussusception each year, and it is only in advanced cases, not relieved by treatment, that peritonitis occurs. It has seemed to me that this intestinal displacement, the results of which are so serious, would be less frequent if any deviation from the normal action of the intestines in infants were at once corrected, and tossing or rough handling of infants were never allowed.

Peritonitis, occurring from appendicitis, not uncommon, as we have seen, in childhood, and due to the presence of a hard substance, usually a seed, in the appendix, would rarely occur if such indigestible substances were not swallowed. It is an important duty of parents and physicians, so far as opportunities allow, to warn children of the danger of swallowing the seeds of fruits, and, if they heed the warning, many lives would be saved.

Treatment.—Scarcely any disease more urgently requires early and judicious treatment than the one which we are considering. Many lives are lost through delay in summoning the physician, as well as by the employment of remedies in the beginning of the attack which are not sufficiently active, and are inadequate to check the progress of the inflammation. When the physician is summoned to a case, he should not only diagnosticate the disease, but should, so far as possible, ascertain the cause. The indication is to subdue the inflammation as soon as possible, and, at the same time, to employ such dietetic and medicinal remedies as will sustain the strength and prevent heart failure, which is the ordinary cause of death.

Proper selection of the diet is a matter of importance. Such food should be recommended as is most concentrated,

predigested or of easy digestion, and such as will produce the minimum amount of faecal matter. I have obtained the best results from milk sterilised by heat, peptonised by the peptogenic powder, with the addition, for those over the age of two years, of some easily digested farinaceous food, and one of the beef peptonoids. Concentrated and previously digested food is especially required, on account of the vomiting and feeble digestion of the patient.

I have alluded to the importance on the part of the patient of remaining quiet in bed, with the least possible movement of his body and lower extremities, during the active period of the inflammation. The most comfortable position in bed is upon the back, with the thighs flexed. Even the muscular effort required to turn upon the side aggravates the pain, and should be forbidden, and the bed-pan should be used to receive the evacuations.

During the present year an adult patient in my practice, who had reached about the twentieth day of peritonitis, and had so far improved that the pain and tenderness were slight, was allowed to leave the bed for the purpose of defecation. Immediately the symptoms were aggravated, the temperature rose three degrees, and the peritonitis was prolonged probably one week beyond the time which it would have continued had the patient remained quiet in bed.

In the ordinary forms of peritonitis, in children as well as in adults, purgatives act injuriously, since the attrition of the peritonaeal surfaces caused by the peristaltic and vermicular movements tends to increase the inflammation. If, therefore, when summoned to a case we are informed that there has been no faecal evacuation for a day or more, no purgative should be administered, though perhaps a laxative clyster of soap and water, or glycerine and water, may be allowed as preliminary treatment. But subsequently, I believe it is better not to employ any treatment designed to open the bowels during the active period of the inflammation, even if one or two weeks or more elapse without a stool. If the patient live, and the symptoms of peritonitis have abated, and it appear

desirable to open the bowels, laxative or perhaps nutritive enemata should be employed for this purpose. According to my observations, in cases that are successfully treated, after twelve or fourteen days the peritonitis has to a considerable extent abated, the muscular coat of the intestine resumes its function, and faecal evacuations are likely to occur without assistance. The occasional escape of gas, and the rumbling and gurgling sound heard in the abdomen, indicate the return of the intestines to their normal state. The late Prof. Flint, who has not been surpassed as a clinical observer in this country, wrote as follows in regard to the treatment of peritonitis: ". . . it has occurred to me, as to others, to see the intensity of the inflammation reproduced by the too early administration of a cathartic, when the disease appeared to be progressing favourably, the patient's life, apparently, being lost in consequence." He adds, "Cathartics, then, should not enter into the treatment of this disease."

Prof. Flint also says, "In the treatment of this disease the main reliance is on opiates." This remark, made by one who had observed the disease chiefly in adults, is applicable also to the ordinary form of peritonitis in children. Opium relieves not only the tenderness and pain, but also the vomiting. It produces a quiet state of the intestines, and enables the patient to remain quiet in bed. It should be given in doses sufficiently large and frequent to produce this effect. A child of twelve years can take half a grain of opium every two or three hours, or sufficiently often to procure sleep. During the active period of the inflammation, that is, during the first and second weeks, if there be no signs of collapse, little, perhaps we may say no, internal medication is required, except the use of the opiate, and possibly of one of the pepsine preparations to aid digestion. But in protracted cases, when the pulse is rapid and feeble, and the temperature, perhaps nearly normal in the morning, rises two or three degrees in the evening, a heart tonic—as quinine, camphor, digitalis, or strophanthus—may be required. Since death results from asthenia, symptoms indicating approaching collapse should be closely

watched for, so that appropriate alcoholic stimulation may be employed before it is too late.

The removal of the cause of a disease, if it can be effected safely and without material injury to the patient, evidently contributes greatly to his recovery. The propriety and advantage of performing laparotomy, when in the infant a local peritonitis has resulted from intussusception, or when in the peritonitis of childhood there is reason to believe that it has resulted from the lodgment of a foreign hard and indigestible substance in the appendix, should be carefully considered. The treatment of intussusception in infancy or childhood by large enemata of tepid water, or by inflation with air or gas, as recommended in the books, if employed properly and perseveringly during the first forty-eight hours, will reduce the displacement in a considerable proportion of cases. If it fail, laparotomy, so as to expose the invaginated mass, and its reduction by the fingers, is the only other mode of treatment which affords any chance of success. But the earlier this operation is performed the better the prospect. If it be deferred until peritonitis has commenced, and there be considerable meteorism, laparotomy will probably hasten death. I have witnessed laparotomy in the infant under such circumstances, and the tympanitic intestines, which protruded through the opening in the abdominal walls, could not be returned without so many punctures to allow the gas to escape, and so much injury from manipulation, that death resulted in a few hours, apparently from the shock. Such experiences lead to the conviction that intussusception, when peritonitis has resulted, with tenderness and meteorism, laparotomy is likely to be fatal, and probably should not be performed.

In appendicitis, when the inflammation has extended to all the coats of the appendix, as is ordinarily the case, a local peritonitis is present, and it is considerable if perforation have occurred. The surgeons of New York have saved a large proportion of patients having appendicitis and perityphlitis by laparotomy performed in the right inguinal region, so as

to expose the diseased appendix and allow of its removal, as well as of the hard substance which caused the disease. On the other hand, the highest authorities in the diseases of children, like Prof. Henoch, of Berlin, speak confidently of the cure of a large proportion of the patients with this disease by strictly medicinal treatment. Although laparotomy will probably relieve a large majority of the cases of perforative appendicitis, in which the inflammation is restricted to the right inguinal region or does not extend much beyond it, yet in that other class of cases, in which a violent general peritonitis rapidly results, with marked pain, tenderness, hardness, and swelling in both inguinal, both lumbar, and in the hypogastric and umbilical regions equally, and attended by high fever and a quick pulse, laparotomy, in my opinion, would in most cases result disastrously, unless this general and severe peritonitis be first subdued.

Patients with empyema obtain immediate relief, and begin to convalesce, when the pus is evacuated by thoracentesis. Should not the pus be evacuated in a similar manner, and the abdominal cavity be washed out by a disinfectant, in cases of purulent peritonitis?

Until within the last fifteen years it was the common practice in this country to apply warm applications, as flaxseed poultices, over the abdomen, in the treatment of peritonitis. Patients sometimes state that they feel better with the poultice, and in septic or infectious peritonitis, or when the previous health has been notably impaired and the patient is much prostrated, poultices are perhaps preferable to cold applications. But in the acute stage of peritonitis, as it ordinarily occurs in those whose general health has previously been good, the ice-bag certainly gives more relief than the poultice. Cases like the following, which are not infrequent, show the good results from cold applications. On August 25th, I was summoned to a girl of fifteen years, who had been in the habit of eating grapes freely, swallowing their pits, but whose health was good until the 23d, or two and a half days previously. Her abdomen was distended uniformly on both

sides as much as at the fourth, perhaps the fifth, month of pregnancy, was tender to the touch, and constantly painful. She had vomited frequently, had a pulse of 136 and a temperature of 104°. She stated that the pain commenced nearly three days previously in the right lumbar region. The diagnosis was acute general peritonitis, probably commencing at the appendix. The treatment prescribed was, for internal use, half a grain of opium every two hours; and externally, the constant application of two ice-bags over the right and left inguinal and the hypogastric regions. The next day the temperature had fallen to 100.5° and the pulse to 116. There was no doubt in my mind that this improvement was due as much to the ice as to the opium.

With the exception of the peritonitis that occurs in the newly born, as the result of septic or pyaemic processes, peritonitis in children probably most frequently results from extension of a perityphlitic inflammation caused by a faecal concretion in the caecum, or a faecal concretion or seeds in the appendix, than from any other cause. Pain and tenderness in the caecal region and extending over more or less of the abdomen, with the formation of a tumor at the seat of the caecum and appendix, indicate the nature of the disease. If the treatment be commenced early with the ice-bag and opium in sufficient doses to keep the intestines quiet, and the diet be predigested and concentrated, the majority of patients, I think, begin to improve. The intestines may be kept quiet for a week, and then opened by enemata of glycerine and water. If the patient do not improve with this treatment,—the pain, tenderness, and induration remaining without abatement,—the poultice should, I think, be applied, suppuration promoted, and the abscess opened as soon as suppuration occurs and subsequently treated by antiseptic methods.

QUESTION V.

IN WHAT RESPECTS ARE THE THERAPEUTIC INDICATIONS IN ACUTE DIFFUSE PERITONITIS MODIFIED BY THE AETIOLOGICAL FACTORS?

By George Tucker Harrison, M. D., of New York County.

(*c*) *In women: from imprudence or exposure during menstruation; extension from pelvic peritonitis, peri-uterine cellulitis, metritis, salpingitis, ovaritis, etc.; from gonorrhoeal infection; from abortion; puerperal, extending from metritis, or by septicaemia; sequent to abdominal section.*

In other words, What are the indications of treatment in acute diffuse peritonitis in cases belonging to the domain of the gynaecologist and obstetrician?—for so I regard the scope of the question.

Prophylaxis, first of all, demands our earnest consideration. In all gynaecological operations, the possibility of the origin of this dread disease should never be overlooked, and our measures taken accordingly. The young girl should be taught the great importance of a proper care of herself during menstruation, and the use of aseptic napkins enjoined. All morbid conditions which act prejudically upon menstruation should be removed, and may thus be considered prophylactic.

When gonorrhoeal infection has occurred, energetic measures should at once be taken to prevent the extension of the disease. The puncture of ovarian cysts, formerly so often made for diagnostic purposes, should never be practised, as the circumscribed peritonitis resulting therefrom diminishes the chances of success in the subsequent operation, and, moreover, may lead to general peritonitis. A distressing case of this character came under my observation recently. The

patient had an ovarian cyst, which was punctured by her physician; soon afterwards acute diffuse peritonitis supervened. At this juncture I was called in, and though I succeeded in localising the inflammation, she subsequently died of exhaustion.

In the treatment of childbirth and abortions, we should bend all our efforts to avoid septic infection. No better proof can be adduced of the efficacy of antiseptic methods applied to obstetrics than the well known fact that the lymphatic form of peritonitis has almost entirely disappeared from properly conducted lying-in institutions,—so that the younger generation of medical men connected with such institutions know only of the severe forms of puerperal septic peritonitis by reading of it. In regard to the treatment of the disease, we must discriminate, at the outset, between the non-infectious and infectious forms of peritonitis. The therapeutical procedures demanded in the first named are imperatively operative. Such a form of general peritonitis is evoked, now and then, by the rupture of an ovarian cyst.

Here no laboured argument is necessary to show that a laparatomy with removal of the offending cause is indicated. But also in the cases in which this form of peritonitis is connected with menstrual disturbances, or originates from general causes not demonstrable, with the light of modern experience it is our bounden duty to perform laparotomy, to cleanse the abdominal cavity of all foreign matter, throw in some finely powdered iodoform, taking care not to be too lavish in its use, and then close up the external wound. The septic forms are all called forth, although the demonstration may not be entirely free from objection, by micro-organisms which gain admission into the body. If we leave out of consideration erysipelatous and diphtheritic inflammation, on account of their rarity, the two forms with which we are mainly concerned in practice are the septic, in the evident signification of the term, and the gonorrhoeal.

The most exquisite forms of septic peritonitis occur in association with childbirth and after gynaecological operations,

especially those involving the opening of the peritonaeal cavity, where they still occur much too frequently. While gonorrhoeal infection usually develops slowly and leads to the chronic forms of peritonitis, the tubal catarrh being the chief factor in the chain of morbid phenomena, occasionally acute diffuse peritonitis may be caused by it. In treating a case of general peritonitis, the first symptom which solicits our attention is the pain, and opium is here our mainstay, for it maintains the intestines in a quiet state, and undoubtedly assists in localising the inflammation. In those cases in which opium cannot be tolerated by the patient by mouth or rectum, our reliance must be upon the hypodermic use of morphia.

A question, which of late has been much discussed, is, whether in beginning peritonitis we shall give a laxative or not. In speaking of the ascending form of puerperal suppurative peritonitis, Kehren declares that, after the use of laxatives, the meteorism, the spontaneous pain, and that elicited by pressure, remit, and the patients feel essentially relieved after frequent evacuations. In a pronounced case of septic peritonitis, however, he admits that only harm can come from their use. As is well known, Lawson Tait advocates the use of saline cathartics in cases of threatened peritonitis, and this is the general practice after laparotomies. When peritonitis, however, has already developed, and especially in cases of plastic and suppurative peritonitis, in which cure is possible by the exudation becoming encapsuled, purgatives can only be productive of harm. So, too, when a case of pelvic peritonitis threatens to become general, cathartic medication is contra-indicated, because with the increase of peristalsis the localisation of the inflammation is hindered. In the treatment of this affection, of all the therapeutical resources at our command, not one exceeds ice applied to the abdomen in the form of one or two rubber bags filled therewith, or, if preferred, the rubber coil with a current of ice-cold water passing through it. The first is most available, as a rule. By this means pain is moderated, peristalsis is restrained, and the inflammation is often local-

ised. So great is the relief obtained, that repeatedly I have been able to discontinue the use of opium, after a resort to the ice. A word of warning is here in place. In anaemic and enfeebled patients, the application of ice directly to the abdomen in a rubber bag may produce gangrene, as I have observed in two cases. A piece of flannel should, therefore, be placed between the skin and the ice-bag, or it may be necessary to discontinue the ice. Hot applications in the form of poultices I never use, and I have yet to see the patient whose symptoms were ameliorated, to any extent, by their employment.

One of the most annoying and distressing symptoms afflicting the patient is the meteorism. Temporary benefit may ensue from the use of an intestinal tube forced above the sphincter tertius to give exit to the gases accumulated above. The recommendation of Frühling is also worthy of trial. That is, by cautious massage, with a free use of vaseline or oil, beginning at the caecum, to endeavour to move the gases forward through the large intestine. When the meteorism is excessive, it has been recommended by some authorities to puncture the intestine with a fine hypodermic needle.

As important as the subject of diet is, I shall not enter into its discussion, the time at my disposal not permitting; and, moreover, the principles that should guide us are not recondite.

With the extended domain that operative surgery has conquered, the obstetrician and the gynaecologist are confronted at times with the burning question in regard to the cases of general acute septic peritonitis in which laparotomy is indicated, with the view of laying open the peritonaeum, cleansing the abdominal cavity by sterilised water or weak solutions of boric acid, and then draining. If the entire organism, however, is infected, the opening of the peritonaeal cavity and the removal of its septic contents cannot save the patient. After the performance of laparotomies, I have repeatedly seen the peritonaeal cavity reopened for the relief of acute septic peritonitis, but never with a favourable termination.

Well worthy of careful consideration are the words of Kehren in this connection: "It is necessary," he observes, "to have a clear perception; first, that in septic peritonitis we have to deal with premature, even primary, infection of the entire body with septic bacteria or poisons; secondly, that the bacteria continually circulate through the lymph, and, perhaps, blood-vessels of the genitalia; thirdly, that an extensively ramified system of clefts and cavities, hardly accessible, is to be cleansed of a copious exudation; fourthly, by that, numerous adhesions, which shut off some of the many sections of this system of cavities from the remainder, are destroyed; fifthly, that the peritonaeum is a membrane highly susceptible of absorption, from which our antiseptics are quickly conveyed into the blood, and then easily call forth phenomena of empoisonment, all of which are circumstances which render the solution of our problem extraordinarily difficult." Dr. Senn, in his excellent work on the "Principles of Surgery," declares that "diffuse septic and suppurative peritonitis are seldom, if ever, cured by laparotomy." It is certainly true, that if good results are, in the future, to be expected from the operative treatment of acute septic peritonitis, early intervention is imperatively demanded.

QUESTION V.

IN WHAT RESPECTS ARE THE THERAPEUTIC INDICATIONS IN ACUTE DIFFUSE PERITONITIS MODIFIED BY THE AETIOLOGICAL FACTORS?

By John G. Truax, M. D., of New York County.

The time allowed will not permit me to refer to more than the medical side of the question. Can the physician (the word physician used in contradistinction to that of surgeon) be of any service to a person suffering from diffuse peritonitis, caused by the rupture of any of the abdominal viscera, or of an abscess or aneurism, and the discharge of any irritating substance into the peritonaeal cavity? My answer will be in the affirmative.

Fagge says,—"In the whole range of therapeutics there is nothing more important than the treatment of a peritonitis of this kind. A mistake made at this stage of the disease will almost inevitably prove fatal; and, on the other hand, skilful and judicious treatment will save many lives."

The moment the physician has diagnosticated this condition, he should exercise all the skill of which he is possessed to keep the patient, and especially the injured part, at rest. To accomplish this most effectually, he should be placed upon his back; he must not be allowed to sit up for any purpose; his thighs should be raised, and supported in that position; nothing should be given to move his bowels; in fact, everything should be done to prevent a movement for at least ten days.

Habershon reports one case where, after death, castor oil was found floating upon the material effused into the abdominal cavity. It is hardly a question whether any nourishment should be taken by the mouth, when it is suspected

that there has been a rupture of the stomach or intestinal canal. If the rupture is known to have taken place through the wall of the stomach, then no intelligent physician would give nourishment by the mouth. The starvation plan of treatment is the only correct one to follow. All foods and medicines should be given per rectum. It has been my custom, in such cases, to allow the patient to have pieces of ice to allay the thirst of which they so frequently complain. The ice should be given in small pieces, and at intervals of some minutes.

Peritonitis, arising from perforation of the stomach and discharge of a portion or all of its contents into the abdominal cavity, terminates fatally, generally in a few hours; so, if called to a case of some days' duration, it would be perfectly safe to give a bland diet by the mouth.

Since Graves gave opium, in the year 1822, no other drug has been able to supersede it in the treatment of peritonitis, the objects for which it is given being to allay irritation and keep the bowels at rest. The amount of opium tolerated in these cases is very great. A grain often can be taken every hour or two for several days.

Many German physicians, and among them Niemeyer, are in favour of cold applications to the abdomen. My experience has led me to favour hot applications and counter-irritants. I believe the larger proportion of the profession in this country and in England have reached the same conclusion. Leeches applied over the most sensitive part of the abdomen have, at times, in my experience, given great relief. This last remedy is especially efficacious in circumscribed peritonitis. Turpentine stupes, enemas of warm water with a little turpentine added, puncture of the intestines and the introduction of the intestinal tube, may all be used with good effect in our efforts to relieve tympanites.

Peritonitis, arising from any other cause than perforation of some of the abdominal viscera, may require of the physician some deviation from the plan of treatment I have already given.

Peritonitis, caused by faecal impaction, may be relieved by enemata. I think it doubtful whether cathartics can ever be administered without some danger to the patient; though at first thought this would seem to be the rational treatment.

In speaking of the treatment of peritonitis, caused by ulceration of the caecal appendix, Fagge says (and he is sustained in his opinion by his colleagues in Guy's hospital),—"I believe that, when properly treated, it is infinitely less dangerous than is supposed. I have never myself seen a case of this kind terminate in death, when its nature was correctly diagnosed, and when it was treated by perfect rest and opium, with no purgatives or enemata. Nor, of late years, have any fatal cases occurred in Guy's hospital, except such as died very shortly after admission." Yet in one year there were fifty-two autopsies made on people who died of peritonitis in Guy's hospital.

The physician should never fail to treat the primary lesion, whatever it may be, which produced the peritonitis. By removing, when it can be done, the exciting cause, he will render it possible freqently to cure the peritonitis, and when the causative element can only be relieved, it will be a change in the patient's favour.

Salpingitis, with the inflammatory process extending to and involving the peritonaeal covering, may be the exciting cause. The physician who did not recognise the salpingitis and treat it, as well as the peritonitis, would fail in the full discharge of his duty to the patient.

In the ten minutes' time allowed me it will not be possible to refer to each cause of peritonitis and its special treatment. The general principles, to which your attention has been called in this short paper, can be adapted and modified so as to make them apply to all cases.

Before closing, I desire to say that I have the histories of seventeen cases of general diffuse peritonitis, not of traumatic origin, which have been treated by myself. Ten of them died; seven recovered. Twelve were caused by the decomposition of portions of retained placenta and the

absorption of the poison. Of these twelve cases, eight were fatal. One was caused by intussusception and sloughing of the intestine, and resulted in death. The others were caused by typhlitis, of which one died and three recovered. These were cases treated without surgical operation.

QUESTION V.

IN WHAT RESPECTS ARE THE THERAPEUTIC INDICATIONS IN ACUTE DIFFUSE PERITONITIS MODIFIED BY THE AETIOLOGICAL FACTOR?

Opiates in acute peritonitis.

By Stephen Smith, M. D., of New York County.

Professor Alonzo Clark, in his article on "Peritonitis" in "A System of Practical Medicine," makes the following statement: "In 1840 there was a very fatal visitation of puerperal fever in this [Bellevue] hospital. . . . I was a daily visitant, and took notes of all the cases. . . . The disease was fearfully fatal, although every known mode of treatment was tried in different cases. . . . But all, with one or two exceptions, with the same result. At this time the opium plan was on its trial, and I had not acquired a confidence in it that authorised me to try it in these cases. The time for it came in 1851. Then a sudden, vigourous attack occurred. One woman was sent to me in whom the disease was well advanced. I instructed my house physician not how much opium to give, but what effects to produce by it. I found this woman dying next day, and that she had taken only three grains of opium in three doses. In three or four days, seven cases were sent to me from the lying-in wards. One was returned for error in diagnosis, and six put under treatment. Having found that prudence was so much more conspicuous in my house physician than courage, another house officer, who combined them both, was selected to be in almost constant attendance. The instructions were in these words: 'I want you to narcotise those women to within an inch of their lives.' He did it, and saved every one of them. This gentleman is now known over the whole land as

a learned and distinguished surgeon. I feel called upon to give his name in this connection, that he may be a witness to the facts I state, and for the admiration with which his nerve and prudence impressed me."

It is an interesting fact that Professor Clark failed to give the name of the gentleman he so highly complimented, and whom he thus publicly called to witness to the truth of his statement. As I was then a resident student in Bellevue hospital, and had the care of the six cases to which he alludes, I assume that I am the person referred to, and will take this occasion to witness to the facts Professor Clark brought forward in his paper.

At the period mentioned by Professor Clark, Bellevue was a hospital in name only. The buildings were erected in the early part of the century, 1811–'16, for prison and alms-house purposes. They were chiefly built on ground reclaimed from the river, and without under-drainage or sewerage. The buildings were very massive in construction, and in the prison style of that day, without pretence of ventilation. For a quarter of a century Bellevue was little else than a prison or a pest-house. All forms of contagious and infectious diseases were received into its crowded and ill-ventilated wards. At various times yellow-fever, typhus and typhoid fevers, small-pox, and cholera have been the prevailing diseases of its inmates.

The evolution of this establishment into a hospital was a very slow process. The prisoners were first removed to the Island, and gradually all the able-bodied paupers were provided with quarters in the new alms-house. In time only the sick poor were detained at Bellevue, and the institution assumed the general aspect and character of a hospital. In 1840, the date to which Professor Clark alludes, the hospital had a resident physician who was the sole authority in managing its general and medical affairs. The appointment was purely political, and the government was of the same character. In 1846–'47 there came a complete change in the administration of the institution, by the selection of a competent

medical board and the final retirement of the resident physician. At this latter date, Bellevue as an organised hospital had its origin.

There was, however, comparatively little improvement in the sanitary condition of the hospital buildings for many years. Gradually better ventilation was secured, and the general cleanliness of the wards and beds was improved.

The maternity wards of Bellevue were, at this early date, in the same condition as the other wards. They were not specially separated from the other wards except that they were situated at the extreme end of one of the wings. The number of con finements averaged one daily usually, though they occasionally reached the number of sixty in a month.

Puerperal fever was the great scourge of the hospital at that period. Whenever it appeared nothing seemed to control its progress, and no treatment saved its victims from a speedy death. These facts are confirmed by referring to the outbreak in 1840, alluded to by Professor Clark, and reported by Dr. Vaché, the resident physician. The latter states that "the disease made its appearance on January 12, 1840, and was quickly followed by two more cases apparently so malignant that it was immediately determined to vacate the room with a view to its purification. The inmates were accordingly removed, and the apartment whitewashed, ventilated, and scrubbed; the bedsteads were cleansed, new beds and bedding introduced, and at the expiration of about a week it was considered sufficiently disinfected to return to it in safety. But the disease immediately reappeared equally as violent and irremediable as before, and it was concluded most judicious to abandon the building. As promptly as it could be accomplished, another, some distance from the alms-house, and appropriated for a nursery, was put in the most perfect order. The bedsteads were cleansed and painted; new beds and bedding were furnished; the physician and nurse were changed; the pregnant women were directed to cleanse their persons by bathing; new clothes, even shoes, were given to them immediately previous to transferring them to their new

habitation; and all intercourse was arrested with the inmates of the surrounding premises. Notwithstanding these precautions, the first woman confined, and subsequently four others in succession out of five labours, were attacked with the disease, and in every case it was fatal. A further effort in the cause of human life, and as the only rational means of arresting this terrible scourge, was the total abandonment of the lying-in establishment at Bellevue: this was done without delay."

To the earlier resident medical students at Bellevue hospital this sketch presents a graphic but familiar picture of an outbreak of puerperal fever in the years 1840–'51. Cleanliness and isolation of patient and physician were the chief preventive measures employed, but they were powerless to control the spread of the disease.

The mortality reported by Vaché was appalling. Of twenty-one cases, nineteen, or over ninety per cent., proved fatal. Nor was this death-rate unusual, as we learn from other sources.

It is important to notice the pathological conditions which were found to exist in the fatal cases. Careful autopsies were made in seventeen of these cases. The records of these autopsies, as published by Dr. Vaché, were made by Professor Clark, for he states that he was a daily visitor and took notes of all the cases; and that it was from these notes that Vaché compiled his report of the epidemic.

In sixteen of the seventeen cases examined post mortem, there was, according to these notes, peritonitis. In these cases there was effusion into the peritonaeal cavity, which is variously described as "sero-purulent" and "sero-lymphatic." In seventeen, or all of the cases, the uterus was examined, and the pathological changes reported. In two cases this organ appeared to be without any special change. In the remaining cases the alterations were those due, apparently, to metritis. In several there were putrefactive changes of matters within the cavity, as the remains of the placenta and the natural discharges after childbirth. The following is an

example: "The cavity of the uterus was covered over, from the fundus down to the cervix, with a dark, chocolate, stringy, foetid substance, which was easily scraped off with a knife showing the surface beneath injected; the cervix was covered with a firmly adherent substance, of a greenish-gray colour, with spots of white; the os uteri was of a dark purple colour: beneath the peritonaeal surface of the uterus there was much lymph deposited."

In several instances pus was found in the ovaries and Fallopian tubes. Pus was also found in considerable quantity between the uterus and bladder. In one case many peritonaeal bands had formed, binding the viscera together; an abscess four inches in diameter separated the peritonaeum from the walls of the abdomen; the sub-peritonaeal cellular tissue of the pelvis, and extending nearly to the kidney, resembled lint soaked in pus; numerous deposits of pus were found under the peritonaeal covering of the uterus, in the broad ligaments, ovaries, and Fallopian tubes; the left internal iliac vein was closed by a firm clot which extended into the gluteal, ischiatic, and obturator branches, and in the clot were found collections of pus."

The records of these autopsies were more or less accurately repeated on every recurrence of puerperal fever at Bellevue hospital between the years 1840 and 1851. They undoubtedly may be taken as illustrating the ordinary form of puerperal peritonitis, when that disease prevailed in this hospital.

It is important, also, to notice the treatment of these cases, which is given in considerable detail. Of the two cases which recovered, the principal treatment in one was saline cathartics, wet cups to the abdomen, and opiates; and in the other, venesection and leeches to the abdomen. Of the fatal cases, four were treated with saline cathartics and venesection chiefly; in eight, calomel in scruple doses was given, combined with venesection and leeches; in ten, venesection was the more important feature in the treatment, combined in five cases with leeches; in five cases, turpentine, as a cathartic, was largely employed. In one, large doses of cinchona bark

were used, as recommended by Dr. Burns, and later, turpentine as a purgative.

It will be seen that the treatment was so mixed that it would be difficult to draw any conclusions as to the efficiency, or rather inefficiency, of any one remedy. Still it is noticeable that purgatives were actively and efficiently employed in seventeen of the twenty-one cases, and that in five cases the cathartic was salts. In the other cases, calomel and turpentine, two approved antiseptic remedies, were administered freely. Opiates in the form of opium and Dover's powder were given in most cases, but in small and occasional quantities.

This review of the outbreak of puerperal fever in 1840 may be regarded as fairly illustrating the average features of the recurring appearances of the scourge in the lying-in wards of Bellevue hospital prior to the year 1851. Professor Clark truly says,—"Up to the time when the opium treatment was adopted, peritonitis was a fearful word: a large proportion of those attacked by it died of it."

I was one of the resident staff of surgeons of Bellevue hospital in 1851, and well remember the excitement created when the first case of puerperal fever was announced. To the visiting staff it meant a hopeless struggle with a violent pestilence, and to the resident staff the loss of the obstetric service, which was highly prized. Professor Clark had already in his lectures, and especially in the Pathological Society, advanced the opinion that opium might prove to be a successful remedy in peritonitis. He related his experience in cases which he saw in consultation with physicians in Vermont, where he lectured during the autumn months. He says, in regard to his experience,—

> I found that they were treating the disease on the Armstrong plan,—that is, bleeding freely, and then administering a full dose of opium, as they said, "to prolong the effects of the bleeding." In most cases there was a second bleeding and a second administration of opium. I found they were getting better results than we were in New York, and I studied their cases as closely as I could, and reached the conclusion that opium

was the curative agent, and that it would be safe to omit the abstraction of blood. The conviction grew in strength with every new case, and I saw several cases with different physicians. . . . The idea then formed was, that to establish the narcotic effects of opium within safe limits, and continue them by repeated administration of the dose, would cure uncomplicated peritonitis; that a kind of saturation of the system with opium would be inconsistent with the progress of the inflammation, and would subdue it. There was no theory to build the treatment upon, and no explanation of the action of the drug, in my mind. What I saw of the action of two doses of opium was the only foundation for the idea.

The first case of puerperal fever in the outbreak of 1851, in Bellevue, resembled in all its peculiarities those of previous epidemics. The onset was violent, the symptoms characteristic, and the termination rapidly fatal. The patient was early transferred to Professor Clark's ward, and there were great anticipations of the success of the opium treatment. The uninterrupted progress of the disease to its fatal termination in spite of the opium administered, produced a very unfavourable impression upon the visiting physicians as to the alleged value of this remedy. Professor Clark declared, however, that the opium had not been fairly tested, for it was found that the drug had been given in such very small quantities that no such effects could have been obtained as he intended or desired.[1]

Three new cases were soon after transferred to Professor Clark's care; then two more, and then one, making in all six. They occupied a separate ward, and Professor Clark determined to make a thorough test of the opium treatment. Special nurses were provided, and I was selected as the immediate medical attendant. His instructions were very explicit. He required that I should aim to see the patients every hour, and should closely watch the pulse and respiration, and personally see that the medicine was regularly given. In regard to

[1] "The drug symptoms to be produced," Professor Clark says, "are subsidence or marked diminution of the pain; some or considerable tendency to sleep; contraction of the pupils; reduction of the breathing to twelve respirations in the minute; in the favourable cases, a considerable reduction in the frequency of the pulse; a gentle perspiration; an itchy state of the skin, and, oftener, of the nose; absolute inactivity of the bowels; and after a time, a subsidence of the tumor and tenderness in them; some suffusion of the eyes."

the opium, he stated that I must not be governed at all by the amount administered, but by the effects produced. The condition of the patient to be secured was that of semi-narcotism; this was to be determined by the degree of stupour and the respiration; the patient must require to be shaken to be aroused to consciousness; and the respiration might fall to twelve per minute, but not below that figure. In concluding his instructions, he inquired if I had ever heard the school-master say, "I will whip you within an inch of your life." And being assured that I was familiar with the expression and its significance, he said, "I wish you to give these patients opium to within an inch of their lives."[1]

The treatment was immediately begun. The opiates were given in the form of morphine, solid opium, and laudanum, but the quantity of each was accurately determined by the apothecary and estimated in grains of opium. At the outset, each patient received one grain of opium every hour, for three doses. No effect being perceptible, the dose was increased to two grains every hour, and continued for three doses. Failing with this dosage, the opium was increased to three grains every hour. In four cases, this amount of opium had the desired effect, and it was continued in that amount. In the remaining cases, it had to be increased to four grains every hour. One of these remaining cases yielded to this amount, and the opiate was continued at that rate. The other or sixth case was much more obstinate, and the opium was steadily increased until the dose reached twelve grains every hour. This amount simply secured a light but

[1] Professor Clark thus describes the method of medication: "The plan is to begin with a dose that is safe, say two or three grains of opium, or its equivalent of sulphate of morphia, and in two hours notice its effect. If any of the opium symptoms have appeared, repeat the dose; if none, increase by one grain, and so on at intervals of two hours till the degree of tolerance in the patient is ascertained. After that the case can be treated by a diminished occupation of the physician's time, two or three visits a day. The dose is to be increased if the opium symptoms diminish, or discontinued if narcotism is approaching. The duration of the treatment will be sometimes no more than two or three days; it may be a week, or even a fortnight; and in one case the symptoms persisted mildly for forty days, and then yielded. In this case the medicine used was sulphate of morphia, and the enormous dose reached, by steady and gradual increase, was one grain and a quarter every forty minutes in a boy ten years old.

continuous sleep, from which she readily awoke on placing the hand upon her wrist to examine her pulse.

The first four cases continued to receive three grains of opium every hour for three or four days, when the pulse fell to its normal standard, the tympanites subsided, the tenderness of the abdomen disappeared, and the patients were evidently convalescent. The opium was discontinued. They rapidly recovered, and remained well.

In the fifth case, an episode occurred which Professor Clark mentions, but not accurately. The patient was a tall young woman, having a pale and somewhat cadaverous face. On the fourth night, while the four-grain doses of opium were being given, the nurse failed to wake me at the usual hour, and I overslept two hours. On awakening and noticing the time that had elapsed, I hastened to the ward. The nurse was sleeping soundly in her chair. The patients were all sleeping heavily, and apparently doing well, except the fifth. On approaching her bedside, I was struck with her death-like pallor heightened by the feeble light of a candle on an opposite shelf, her half-opened eyes, her fallen jaw, and the absence of pulse. I stood a moment, quite paralysed at the thought of my neglect and that of the nurse, when I noticed that she gasped. There was an interval, and then another gasp. I counted these efforts at respiration, and found that the fourth occurred just after the minute had expired.[1]

I at once roused the nurse, and took active measures to recover the patient from her profound narcotism. After several hours' continuous effort, she was regarded as securely restored. All the symptoms of peritonitis now rapidly subsided; the pulse had fallen from 112 to 92 per minute; the tympanites and tenderness had disappeared, and she expressed herself as feeling well. Within twenty-four hours all the

[1]Alluding to this subject, Professor Clark says—"Of these several signs of opiumism, there is none more valuable than the frequency of the respiration; and while the physician aims to reduce it to twelve in a minute, there are chances that he will see it fall to something below that. I have often counted it at seven, and in perhaps two cases it fell to seven in two minutes; and yet these cases of marked oppression from opium all recovered."

evidences of peritonitis recurred, and the treatment was renewed, three grains of opium being given instead of four. Semi-narcotism was readily produced, and after a brief period the symptoms again subsided, the treatment was suspended, and she was permanently cured.[1]

The sixth case proved an anomaly in tolerance of opiates.

[1] The following notes of one of these cases, contributed by Professor Clark to Keating's edition of Ramsbotham's System of Obstetrics, illustrate the symptoms and progress of the disease while under treatment, and will prove instructive to those unfamiliar with this method of medication:

A. H——, aged twenty, married, delivered of her first child October 1, 1851. The labour was natural and of the usual duration; convalescence was not attended by any untoward symptoms except a slight diarrhoea. . . . On the tenth day after confinement she was seized with a chill at 10 a. m.; chill lasted an hour; the abdomen was markedly tympanitic and extremely tender, and the seat of lancinating pains which caused sobbing; pulse 120; respiration thoracic; tongue clean. Ordered solution sulph. morph. (gr. xvi., to aquae, ℥ j.), m. x. every hour. She slept most of the day and succeeding night quietly, but not profoundly.

Second day, 10 o'clock.—Tympanites increased; tenderness somewhat diminished; extreme thirst; occasional vomiting of a bright green fluid; bowels quiet; lochia had ceased previous to attack; pulse 120; other symptoms as before. It was obvious that not much impression had been made upon the disease in the first twenty-four hours, and the solution was given m. x. every half hour. This produced sleep, and by evening the pulse had fallen to 90.

Third day.—Tympanites and thirst continued; retention of urine; intellect rather obtuse; other symptoms as before. The morphine solution was now increased to m. xxx. every hour. Those doses were continued from noon to six or seven o'clock in the evening, when the signs of narcotism became rather alarming. She slept heavily; was roused with difficulty; would not reply to questions; pupil contracted almost to a point; pulse 68, and respiration 7 in the minute. The opiate was suspended, and tablespoonful doses of coffee administered. The narcotism continued for six or seven hours, and gradually subsided.

Fourth day.—Tympanites diminished; tenderness markedly less; features composed; intellect rather dull; pulse 78; tongue dry in the centre; green vomiting occasionally; slight hysterical symptoms; respiration 15; morphine solution resumed, m. x. every half hour. Narcotism recurred at about the same hour as last evening, in which the sleep was very profound, and the respiration only five in a minute. Treatment as on the previous evening. Toward morning these unpleasant effects of the medicine passed off.

Fifth day.—The tongue was dry and slightly brown, but patient declares that she feels quite well; tympanites has nearly disappeared; no pain or tenderness; pulse 80; respiration 15; some appetite. . . . At 11 a. m. morphine solution resumed, m. x. every two hours. At night wakefulness and pain in the abdomen; opium, gr. iij. every hour, under the influence of which she slept quietly.

Sixth day.—Sleeps most of the time; easily aroused, but answers questions slowly and with an effort; tongue moist and not furred; tenderness that recurred last night less; pulse 80; still vomits green fluid; treatment continued.

Seventh day.—Symptoms all improved; opium, gr. j. every hour.

Eighth day.—Abdomen soft and free from pain or tenderness; thirst slight; says "I feel so much better;" was decidedly convalescent. From this time the opium was continued in gradually diminished doses. The bowels were not opened until the thirteenth day. After this treatment was continued a few days she was discharged in her usual health.

During twelve days the treatment was persevered in, the pulse remaining at about 120; the respirations 34 to 36; the abdomen greatly distended and tender to the touch; lancinating pains; the features pinched; perspiration at intervals, etc. During these twelve days this patient took the equivalent of 1,950 grains of opium, and she neither vomited during that time nor had she an evacuation of her bowels.[1] At no time was she so narcotised that she would not awaken when any one placed his hand on her wrist. She remained in the hospital as an assistant in the laundry for six months after her recovery, and during that time she was in excellent health.[2]

The recovery of these six consecutive cases naturally produced a profound impression upon the resident and visiting physicians of Bellevue. As the cases were typical of those ordinarily occurring in that hospital, and as opiates were the sole remedies used in their treatment, it was apparent that a new era in the therapeutics of that scourge had begun.

From this time forward opium continued for twenty years to be the chief remedy employed in peritonitis in Bellevue hospital, with satisfactory results. Opium in peritonitis came into use generally in the city. Professor Clark states "that in private practice the drug has been, perhaps, more curative than in the hospital."

It is apparent from the preceding review, that, previously

[1] No effort was made to secure an evacuation of the bowels during the opium treatment. Professor Clark says,—"Purgatives are entirely inadmissible. The bowels should be left entirely at rest till they recover their muscular tone; then they will expel first the gas and then the faeces; or if, after the inflammation is subsided, they do not move of their own accord, injections are admissible. I have often left the bowels inactive for fourteen days without any recognisable consequences."

[2] The following extracts from the records show the course of treatment of this patient: Treatment was commenced at 10 a. m. with 2 grains of opium hourly; at 2 p. m. dose increased to 4 grains; at 3 p. m. gr. iv.; at 4, gr. v.; at 5, gr. v.; at 6, gr. viij.; at 8, gr. x.; at 9, gr. xij.; at 11, sol. morph. sulph. ℥ iss.; at 12, ℥ j.; at 1:30 a. m. (respiration 6), 0; at 6 a. m. (respiration 12), opium gr. xij.; at 10 a. m., sol. ℥ j.; at 12 m., ℥ ij.; at 1:30, sol. ℥ ij.; at 2:30, ℥ ij.; at 3:30, opium, xxiv. gr.; at 5, ℥ ij.; at 6:30, sol. ℥ ijss.; at 7:30, ℥ ij.; at 9, opium gr. xiv.; at 10, gr. xvj.; at 11, gr. viij.; at 1. a. m. sol., ℥ iiss.; at 2, ℥ iv.; at 3:15, opium gr. xx.; at 4, ℥ iiss.; at 5, ℥ iij.; at 6, ℥ iiiss.; at 6:30, opium gr. x.; at 7, sol. ℥ iiiss.; at 8, opium gr. xxij.; at 9:30, sol. ℥ iv.; at 10, ℥ iij.; at 11:30, ℥ iij.; at 12, 0. On one day she took the equivalent of 472 grains of opium.

to the introduction of the opium treatment, puerperal peritonitis was a most destructive disease in Bellevue hospital, when treated by the methods employed prior to 1851. With the introduction of opium, employed as the chief remedy and in the manner directed by Professor Clark, the same disease, occurring under the same circumstances, became so manageable that a mortality of ninety per cent. was reduced certainly fifty per cent. These facts lead inevitably to the conclusion that the opium treatment has a place in the therapeutics of that affection, of no small importance. Precisely what that position is, it is perhaps impossible now to state.

Professor Clark remarks that he cannot explain the curative action of opium in peritonitis. Professor Fordyce Barker, who has had a large and varied experience in puerperal peritonitis in Bellevue, speaking to the same question, says,— "The most important of all agents in arresting and controlling this disease is opium in some form. Let us see what we gain by its use. The peristaltic movements are retarded or arrested, and thus the inflamed tissues have absolute rest; pain is annulled; emotional excitement is allayed; the nervous system is tranquillised; sleep is secured; and thus the depression of the vital forces resulting from the shock of the attack is lessened."

Professor Clark regarded opium as valuable chiefly in simple, uncomplicated peritonitis. He says,—"When the inflammation of the uterus is the dominant lesion and is purulent, opium has little or no control over its fatality; but in the cases in which peritonitis is the ruling lesion, if begun early it will always show its power." And yet the clinical features of the six puerperal cases which recovered resembled, in all their essential peculiarities, the fatal cases reported by Vaché, in many of which the inflammation of the uterus and its appendages was the dominant lesion. Of course, we cannot assert that the cases which recovered had other lesions than those of the peritonaeum; but six consecutive cases of peritonitis, in the lying-in wards of Bellevue hospital, without any inflammatory changes of the uterus and its append-

ages, would, at the period under review, have been regarded as impossible. Especially would this be true in an outbreak, in which the first case rapidly proved fatal with such complications. We would seem, therefore, to be justified in the conclusion that several cases made a satisfactory recovery at that time, in which the inflammation of the uterus and appendages was the dominant lesion.

Happily, in these latter days, antisepticism has greatly diminished the frequency of this formidable disease, especially the puerperal form, and, in the meantime, the remedial measures have been greatly increased. This improvement is due to a more accurate knowledge of the functions of the peritonaeum, and of the existence and action of pyogenic organisms. The researches of Wegner, Grawitz, and Pawlowsky have determined that the peritonaeum is quite tolerant of simple wounds, and that they heal readily. As a lymph-sac, with stomata in its walls opening into the surrounding lymphatics, the peritonaeum is almost directly connected with the spleen, pleura, and other organs, thus admitting of rapid and general infection by pathogenic microbes when they exist in large quantities. The peritonaeum is not sensitive to injected fluids, provided they do not contain putrefactive bacteria, and even these organisms may be injected in small quantities without harm, as they are quickly absorbed, and destroyed or excreted. But if the peritonaeum has been previously irritated or otherwise injured, pathogenic microbes are far more effective. It appears also that chemical irritants cause inflammation, with haemorrhagic effusion, but without lesion of the intestinal walls or the penetration of microbes into the peritonaeal cavity. Peritonitis, therefore, not due to putrefactive organisms, is local, while peritonitis produced by such pathogenic microbes as staphylococcus aureus is rapidly fatal by general infection. One of the most important results of recent researches is the differentiation of the types of peritonitis which are caused by various agencies.

Nearly coincident with our more intimate knowledge of

the causes of infectious peritonitis was the discovery of the means by which these pathogenic organisms could be destroyed. As these destructive agents must be applied directly to the microbes, the surgeon was brought into this field of therapeutics, and has here won some of his most brilliant victories by boldly opening the peritonaeal cavity and cleansing it with germicide solutions. But as there are many types of peritonitis, having their causation in various conditions, some being of a microbic and others of a non-microbic origin, it is as yet by no means certain where the line is to be drawn between the medical and surgical treatment of this disease. It is probable that the physician and surgeon will more wisely treat the multiform types of this affection by acting in concert, and discreetly employing the measures which each possesses according as they may jointly interpret the indications.

Whatever may be the possibilities of the art of surgery in the treatment of peritonitis—and they are by no means inconsiderable—the question may be pertinently asked, Has any remedy or combination of remedies, in the hands of the physician, given results equal to, or better than, opium, in a series of cases similar to those recorded in this paper? And if it be true that by employing opium, as recommended by Professor Clark,[1] more than fifty per cent. of cases of peritonitis as met with in practice can be saved, should not this method of treatment be at once adopted in all cases, and the resources of surgery be applied where the manifestations of the disease indicate the necessity of its additional remedial measures?

[1] Professor Clark had a large consulting practice subsequent to this time, and he says, "I have seen many cases in consultation, and a decided majority have recovered."

QUESTION V.

IN WHAT RESPECTS ARE THE THERAPEUTIC INDICATIONS IN ACUTE DIFFUSE PERITONITIS MODIFIED BY THE AETIOLOGICAL FACTORS?

By Thomas H. Manley, M. D , of New York County.

To this question one might at once give a definite and epitomised answer, that in diffuse peritonitis the same therapeutic indications exist, according to causative conditions, as in general inflammation of any other serous membrane in the body.

Regardless of the causation, the objective treatment must be identical in all cases of diffuse peritonitis during its acute stages. This will be directed with a view of relieving pain, securing rest, sustaining the patient, moderating the violence of the disease, or aborting it in its early stages.

The fundamental principles which should guide us in the therapy of the malady under consideration, notwithstanding the extensive experimental work of the laboratory and studies of a biological and bacterial character, have undergone no material change in our time.

It was supposed that the antiseptic theory, and the discovery that the great lymph sac of the abdomen might be invaded with impunity, would revolutionise the treatment of peritonaeal inflammation. But it required only a brief period to incontestibly demonstrate that chemical solutions, when introduced into serous cavities, by their irritating action were so frequently followed by direful results, that they seldom or never can be safely employed for flushing the peritonaeum. The claim that exposure and manipulation of the peritonaeum is a harmless procedure, is another modern delusion; for we have no evidence to-day, of any description

whatever, that the peritonaeum is any less vulnerable to violence than it was in a past decade or century.

General idiopathic peritonitis.—Independent of an infective inflammation arising from a diseased organ or structure, and thence propagated to the entire serous membrane, we meet with peritonitis in association with those constitutional maladies in which one or more of the fibro-serous membranes is the seat of inflammatory changes.

That general peritonitis may develop *de novo*, I believe is beyond question, arising from sudden atmospheric changes, exposure, and depressed health.

In malaria, syphilis, tuberculosis, malignant and benign tumors; renal, hepatic, and cardiac diseases; with many other maladies in which the depuration of the blood is defective, the peritonaeum is often the seat of a low, insidious form of inflammation, attended with a large serous effusion.

The causative factor underlying all those varieties of inflammation in every instance is irritation, the irritant being conveyed through the circulation to the seat of action. A clinical peculiarity marks these different varieties of peritonaeal inflammation. They may be painful, or painless. In some of these cases, in which the peritonaeal inflammation is secondary, pain is generally of a less aggravated description. Indeed, not infrequently, congestion, effusion, and absorption may pass through their various stages without any serious inconvenience except from the pressure of accumulated fluid against adjacent viscera.

In all these cases of general peritonitis, arising in connection with certain constitutional maladies, treatment must be directed rather toward the causative condition than to local manifestations.

For that phase of the malady dependent on specific infection, the mercurials will be administered with a free hand; for the malarial, arsenic and quinine; for tubercular, such remedies as modify or arrest the course of that pathological process.

Certainly, when ensuing as a consequence of toxic ele-

ments in the blood which have been derived from an infectious disease, the efforts of the medical attendant must be mainly directed toward neutralising the poison in the circulation, and stimulating the emunctories to hasten its elimination.

Apparent idiopathic peritonitis, not dependent primarily on constitutional implication.—Of late years it has been maintained by many distinguished authorities, that it is a question whether acute diffuse peritonitis ever develops, except as a secondary consequence of pathological changes in parts adjacent to the peritonaeum,—as infection from perforation of the intestine, or propagation of inflammatory changes in structures over which a reflection of the peritonaeum may lie.

If this position were tenable, one would reason that the whole therapy of acute peritonitis must be revolutionised; for instead of treating the case on empirical lines, as is the practice which generally obtains, we should commence in every instance by first endeavouring to ascertain the precise aetiological factors in operation in each case.

If, for instance, there were perforation of the intestine, gall bladder, urinary bladder, rupture of an abscess, or extension of an ulcerative process, we would open through the abdominal walls, seek out the source of the original trouble, remove or neutralise whatever effete or septic material lay in the way, repair the lesion, and close in the parts.

This is the only logical conclusion to which we can arrive on such a basis: hence our therapeutical resort should be rather mechanical and chemical, than empirical or vital.

Acting on this assumption, of late years, so extensive and frequent are becoming sections into the peritonaeum, that a new specialty has arisen, known as "abdominal-surgery." And, instead of the cautious, conservative methods which were characteristic of a past generation of practitioners in dealing with diffuse peritonitis, latterly the scalpel has been boldly taken in hand, the abdomen opened, its contents freely and leisurely manipulated, the peritonaeal cavity drenched with chemical solutions, employed to destroy infec-

tive agencies and prevent the further advance of inflammatory changes. Besides, a tube is left in the gaping wound to carry away what remained of effete products.

Very often, when the abdomen has been opened in conformity with this line of practice, no well defined local lesion could be discovered, but a yellow, plastic, flocculent material, —in places, partly organised and adhesive; and again, more or less of it undergoing disintegration.

When the belly has been opened under these circumstances, the consequences were usually promptly mortal, few surviving twenty-four hours after the operation.

While the theory which has been advanced, that general acute peritonaeal inflammation always arises from local morbid changes, is not wanting in pathological support as revealed by post-mortem examination in the majority of cases, yet, when we have a correct knowledge of the wonderful and peculiar property of the peritonaeum in walling off and confining suppurative accumulations, sealing up perforations, absorbing secretions or providing a vent for them through the excretory ducts, we can the better comprehend the processes of nature called into active operation when the integrity of this serous membrane is threatened.

The present general reaction, both in America and Europe, against the employment of antiseptics and chemical solutions of every description in the surgery of the serous cavities, the conceded imminent danger to life always attendant on incisions which entail exposure of the abdominal organs, the additional risk connected with pulmonary anaesthesia in the presence of a high temperature and active inflammatory processes, have each and all served as warnings which none but the rash and reckless will ignore, and which, after all, in the treatment of general diffuse peritonitis, have left us about where we were when opium was regarded as our sheet-anchor.

Admitting, then, in part at least, that general, acute peritonitis is most frequently a secondary process,—still, when measures are instituted which contemplate the exploration of

the peritonaeal cavity and dealing directly with diseased foci or the primary lesions, such intervention is attended with so much danger to life and the prospects of recovery so much lessened, that our reliance must be rather on tentative than on radical methods; on internal, epidermic, and hypodermic medication; on sound hygiene, and such measures as will sustain the strength until the violence of the disease is spent.

Treatment of peritonitis as based on clearly defined aetiological factors.—Owing to the periodical activity of the female generative organs within the pelvis; to their abuse, and their frequent pollution by infection through the male organ or through contaminated wounds along the genital tract; and to the demands of modern life on women, peritonitis, local and general, is a very common disease. But with them it usually pursues a sub-acute or chronic course, except in the puerperal variety, and is comparatively seldom fatal.

I never saw but one case of non-traumatic peritonitis in the female end fatally.

On the contrary, with the male, acute diffuse peritonitis is a comparatively rare disease. It runs a short course, and is attended with a great mortality.

This notable contrast in the sexes,—the clear and unmistakable aetiological factors in the one, and the greater gravity in the other,—has a distinct and important bearing on the question of treatment.

The pain of peritonitis, in woman, is not so violent, and is better borne: we may deal with her case in security with milder measures. But with the male, our intervention must be prompt and energetic, for peritonitis, if not subdued, is quickly mortal with him.

Now, the physician, in the presence of a typical case of acute general peritonitis devoid of complications, must not stop to concern himself about the original, aetiological factors, but proceed at once to deal with a condition. This brings us to the question of treatment, and the fundamental principles by which we shall be guided in dealing with acute general peritonitis of the type under consideration.

Let us see what our patient's condition is at the onset of his malady, that we may the better learn what the therapeutic indications are:

He is suffering from bodily weakness, he sleeps little, and has lost his appetite. The heart's action is feeble and accelerated. The temperature indicates fever. He is in constant pain, of varying intensity. He is in a melancholy state of mind. There may be more or less thirst. He lies on his back with his knees raised. Coughing, sneezing, sighing, or bodily movement increases his distress; hence his abdominal and thoracic muscles are more or less fixed, and he respires with short, shallow gasps. The belly is hard and flat, though in cases of great gravity it may be tympanitic. The bowels are closed, and urination may be difficult or impossible.

The integument and sub-cutaneous tissues, over the ventral regions especially, are extremely sensitive to pressure; and the cellular membrane, immediately beneath the skin along the muscular planes, is the seat of a free inflammatory exudate.

Clearly, our first move will be to place our patient in such a condition as to best resist the violence of the disease and prevent it from making further progress. Here we shall find that to a large extent nature has anticipated us. The body is in a state of rest, secretion is in abeyance. The inflamed muscular coat of the intestine is paretic, and, hence, peristalsis has mostly ceased. Digestion, for the time, is impossible; and we are warned not to force it, by the persistent loathing for food which is always present.

The system craves liquids, but the stomach will not tolerate them in large quantities.

The first indication in the acute stages of peritonitis will be to relieve pain.

It is my conviction that it is of no consequence what the agency be which we employ for this purpose, provided its use will not seriously jeopardise life. Hence, not infrequently, free leeching of the abdominal parietes, the application of moist heat, sinapisms, or blisters, often act in a

prompt and salutary manner. And, if not alone, they will, in conjunction with other remedies, serve a most useful purpose. When, however, the pain is of an aggravated character, we must employ a drug which will quickly ameliorate or wholly relieve it.

For this purpose, there is nothing in the pharmacopoeia that will equal opium, for it serves in a marvellous manner many important purposes,—1st, as an analgesic; 2d, as a narcotic; and 3d, as a mental exhilarant. Authors have been said to employ it to "lock up the bowels" and to "splint the intestine." This is "far-fetched," and without any foundation in fact, for from the onset of the malady the intestine is crippled, and constipation is the rule. So continuous and protracted is this, that of late, since the abdominal incision is regarded as so trivial a matter, there are cases reported where the inexperienced have mistaken this paretic state of the intestine for internal obstruction, and opened the abdomen to find nothing.

Nor is any splinting necessary, but rather relaxation, for the inflamed and infiltrated abdominal walls, in a state of spasmodic contraction, hold the visceral contents in a tight grip.

Opium is the ideal remedy here, for it buoys up the spirits, relieves pain, and secures to the patient ample sleep. What it accomplishes toward the full restoration to health beyond this is in an indirect manner.

Unhappily, however, the free administration of opium and its alkaloids is full of danger in the hands of the incautious or inexperienced. Idiosyncrasies must be watched for, and the cumulative action of the drug guarded against. It should be always administered hypodermically, commencing with small doses. For its full therapeutic effect, the drug must be given freely and frequently. This necessitates a large sacrifice of time on the part of the medical attendant, and if he is not ready to make it, then his patient's chances of recovery will be better by the employment of some other remedy attended with le s risk to life.

Opium, though without a rival in peritonaeal inflammation, yet, after all, serves but a subordinate purpose,—for the relief of symptoms only. It makes no impression on the underlying pathological process, but may, through masking symptoms, give rise to delusive hopes, so that the patient may imagine himself out of immediate danger, while mortal changes, only too manifest to the medical attendant, declare the approaching end.

Mercury, since time immemorial, has been known to exert a specific action on inflammation.

In inflammation of serous membranes, if administered with energy and intelligence at the onset of the attack, it stands unrivalled, serving the double purpose of arresting the plastic exudate and hastening its absorption. In conjunction with opium, it constitutes a sovereign remedy. Simultaneously with opium, its administration must be commenced. Nor should we be deterred, because, when excessively or injudiciously employed, salivation or its toxic action may occasionally occur. Used with proper discrimination and judgment, this painful complication should seldom or never arise. As the stomach is extremely sensitive in peritonaeal inflammation, the most effectual manner of administering the mercurial salts will be either by hypodermic injection or by inunction. It must be unsparingly employed, in all cases, until one of three things is distinctly manifest,—1st, that its therapeutic effect has been partly attained; 2d, that symptoms of ptyalism are present, with no abatement of the disease; and 3d, when signs of approaching dissolution are evident.

In acute diffuse peritonitis, then, opium to secure comfort, and mercury as an antiseptic, if you like, or antagonistic to those toxic, lethal elements in the blood, which in high fever always paralyse cardiac impulse, should constitute the main treatment.

GENERAL DISCUSSION.

Dr. JOHN CRONYN, of Erie county, said that the remarks of Dr. Ferguson had pretty accurately expressed his own views on this subject. He desired, however, to make a few remarks upon metastatic inflammation of the peritonaeum, a subject about which but little has been written.

A few years ago he saw, in consultation, a young man who had been suddenly seized with very violent pain all over the abdomen, with little or no distention. He was at the time suffering from some pulmonary affection, which his attending physician hardly thought was tubercular, and, at any rate, did not consider to be immediately dangerous. He thought the violent abdominal pain was due to an attack of acute indigestion, and his opinion was still further strengthened when a day or two later the patient passed undigested raisins from the bowel. Dr. Cronyn was of the opinion that the case was one of metastatic peritonitis of a tubercular character. The case terminated fatally, and at the post-mortem examination the superficial peritonaeum was studded thickly with miliary tubercles, and here and there were very small particles of plastic lymph. It was interesting to note that the case was attended by very little inflammatory action, except just around these miliary tubercles. The lungs were found much more extensively diseased than had been supposed.

He desired to observe here, that fluids injected into the abdominal cavity were absorbed to a much greater extent by the mesentery than by the abdominal walls.

He agreed fully with Dr. Ferguson as to the treatment, but he wished to mention a practical point of some importance. When it is desired to give large doses of opium, it is better to combine it with quinine—two to three grains of opium with from three to five grains of quinine—for in that way much larger doses than usual can be given without producing either cinchonism or narcotism.

Dr. NICHOLAS SENN, of Chicago, continued the discussion. He said,—I have very few additional remarks to make. I desire to speak especially with reference to the aetiology of peritonitis, and the histological changes which take place in consequence of certain pathological processes. I believe there has been some confusion, during this afternoon's discussion, with reference to what is meant by plastic peritonitis and an infective peritonitis, particularly in regard to the mode of infection. I believe that many of the plastic processes in the peritonaeum take place in consequence of traumatic irritation, and that they should no longer be called inflammation. I wish to be distinctly understood as recognising as one of the distinctive features of plastic peritonitis, that the process remains circumscribed. A simple illustration of this, and one familiar to every pathologist, is the peritonitis occurring in connection with a perforating

ulcer of the stomach, where, after weeks and perhaps months of deep-seated irritation,—without, however, any infection taking place,—nature furnishes a wall of connective tissue which prevents the ulcer from perforating into the abdominal cavity. This is an instance of localised plastic peritonitis without any tendency to extension, from the fact that the cause remains localised.

It is entirely different, however, in cases of septic peritonitis—where we include, of course, the acute form—and suppurative peritonitis, where the primary cause continues to multiply, giving rise to a most virulent form of peritonitis, but with an entire absence of all attempts at localisation. It is that fearful form of peritonitis so familiar to the obstetrician, where patients die within forty-eight hours—yes, within twenty-four hours—and where very often the disease is called shock, and is not recognised as peritonitis, because one of the classical symptoms, pain, is not present. These patients feel comfortable, and they even wish to get out of bed, but the pulse beats 150 or 200 times in the minute. Fever, another classical symptom, may also be entirely absent; the temperature may even be subnormal. One of the most unfavourable prognostic symptoms in connection with peritonitis is subnormal temperature. Already, in this discussion, one of the speakers has brought forward as a prominent symptom the feebleness of the voice, but I have heard patients suffering from this most fatal form of peritonitis shout and sing with a preternaturally loud voice. These are cases of peritonaeal sepsis, occurring, not as the result of inflammation, but from absorption of fatal doses of toxines from the peritonaeal cavity. If you have not suspected the disease, you will find on autopsy absolutely no indication of intra-abdominal disease; the most, perhaps, will be a preternatural vascularity of the peritonaeum and a loss of its glossy surface, but no adhesions.

The next most fatal form of peritonitis, due to the same cause but perhaps to a less intense infection, is the fibrino-plastic. Here there is a formation of fibrous adhesions with an attempt at localisation, but reproduction of the process characterises the disease as progressive, and inch by inch new surfaces are involved and new membranes thrown out. It is in these very membranes that the peritonitis is reproduced.

These two forms of peritonitis, then, are characterised, clinically and pathologically, by an intrinsic tendency to progression. On the other hand, the traumatic form, the plastic form without any pathogenic microbes, is characterised by a tendency to remain localised. The new material thrown out to limit the inflammatory process is transformed into permanent connective or cicatricial tissue. It is in this way that perforation is so often prevented, and in the same way, extension of the inflammation is often limited after the application of a trauma.

There is only one form of inflammation which I desire to illustrate this afternoon, by reporting a case which recently came under my obser-

vation. Recognising, as I do, the similarity of the anatomical structure and of the histological elements of all the serous surfaces, I never could conceive that it was impossible for the peritonaeum, as a large sac, not to undergo the same identical changes which we frequently find in shut-off compartments of this membrane, as, for instance, the tunica vaginalis, where we so frequently find a slow form of inflammation, characterised, not by adhesions, but simply by transudation. It is simply a loss of equilibrium between transudation and absorption, resulting in a circumscribed form of ascites, called here hydrocele. It is only very recently that a case of this kind came under my observation in the person of a woman about forty-five years of age, who gave a clinical history of gradual enlargement of the abdomen, dating back three years. The case came to me with the diagnosis of ovarian tumor. Careful examination showed evidences of circumscribed ascites, and it was rather difficult to make a positive differential diagnosis between ascites and a large uniocular ovarian cyst. I was much impressed with its being a tubercular peritonitis with a localised ascites. I performed laparotomy, and found an enormous quantity of ascitic fluid, which occupied almost the entire abdominal cavity—a true ascites. I had previously examined all the organs usually concerned in the production of ordinary forms of ascites, but with negative results. I therefore utilized this opportunity to confirm the results of these examinations. The liver was absolutely normal; there was no enlargement of the spleen, and not a trace of plastic peritonitis. Careful examination of the ovaries and Fallopian tubes, and of the pelvic organs in general, with a view of detecting somewhere a tubercular focus, revealed absolutely no trace of peritonaeal tuberculosis, —simply an increased vascularity of the parietal and visceral peritonaeum throughout. It was evidently the same form of inflammation which produces hydrocele, but in this instance it produced ascites. I drained the cavity with a large glass tube loosely filled with iodoform gauze, and continued this drainage until secretion ceased. This occurred after three or four weeks. Since then the patient has made a complete recovery. The case was simply one of hydrocele on a large scale. I believe these cases are more frequent than is generally recognised. They represent a passive form of peritonaeal inflammation, not due to infection from without, but to a loss of equilibrium between secretion and absorption.

And now, a word regarding an essay read here to-day, as to whether there is such a thing as an idiopathic peritonitis. I can only say, over and over again, yes and yes. If there be such a thing as idiopathic meningitis and pleuritis, why not peritonitis? But what does that mean—idiopathic peritonitis? It means one which is the result of absorption of pathogenic microbes from somewhere—but not necessarily a localised suppurative focus in the neighbourhood of the appendix vermiformis, or the

Fallopian tubes, the usual sites examined for foci of suppurative inflammation; but it means a localised condition of the peritonaeum somewhere, caused, perchance, by a trauma, in which pathogenic microbes are localised, where they reproduce themselves, and consequently spread the process. In any instance of purely mechanical obstruction of the intestine, the wall of the bowel becomes vascular in the vain attempt to overcome the obstruction, and so exhausts itself, as it were; and then the intestinal contents, always loaded with pathogenic microbes, permeate this weakened wall, and, passing into the peritonaeal cavity, produce the so called idiopathic peritonitis.

Dr. Henry O. Marcy, of Boston, said,—I am reminded of the remark once made by the famous General Butler, when asked if he would accept some notes upon a certain case,—"When I get through, young man," he said, "you may rake behind." When Dr. Senn gets through, there is comparatively little raking behind on any subject, and it is something akin to heroism for one to offer his individual opinion.

While I have been very much interested in the discussion, I feel somewhat like the old judge, who said, when he had heard the first attorney, "He has his case," and again, when the other attorney had completed his remarks, "He has his case, too."

But to speak seriously, Is the exudation from the peritonaeum properly a peritonitis? If you answer Yes, you grant certain conclusions, which, if you say belong to infection, you must negative. About five years ago a very instructive case came under my observation. The patient was a drinking man, with albumen and fibrinous casts in his urine. Fifty pounds of free fluid had been removed from the abdomen only a few weeks before. I removed, at intervals of a few days, fifty, thirty, and twenty pounds respectively, and I then concluded that the man must be "put on tap" permanently, as he had been drinking so long. So I let him drain away, and, after taking the pressure off from the mesentery by this means, the secretion ceased. The man has, nevertheless, gone on drinking, and quite recently I heard from him, and he is selling liquor now. Was that a case of peritonitis? If so, we must differentiate our terms. We have opened the abdomen for what we call tubercular peritonitis, and we have done something—we do not know exactly what. We have found evidences of effusion and of tubercle, and we have said the patient must die. But we have found, as a matter of fact, that these patients have not died. What have we done? In the case cited, I thought four years ago that the patient must die, but he is now well and comfortable.

We now come to consider that other class—the infective. How much have we gained in the experience of the last fifteen years? Formerly, when we opened the abdomen and left infection there, we were wont to

say, as Sims used to, that the trouble was with "that red fluid" which gets into the peritonaeal pouch. I made cultures from that fluid, and found that it was always infected. A few years ago a woman who came to consult me said that while stepping from a car something gave way in her side. Forty-eight hours later she was dead, and the autopsy showed the abdomen filled with that flaky lymph to which Dr. Senn has alluded. In addition to this, there was a small cyst of the left ovary with a pin-hole perforation, from which came a thick, molasses-looking fluid. Both fluids were free from micrococci, but contained a kind of bacillus, which I was able to obtain in pure culture. How did the bacillus get there? This is a difficult question to answer, but certain it is that it was the cause of this rapidly fatal peritonitis. Many cases of peritonitis clearly belong to the infective type. An infective peritonitis obviously requires a very different kind of treatment from the other type. The question arises, Can we save a case of infective peritonitis by opening the abdomen?

A child four years old had an abdominal effusion, with a temperature of 105°. The fluid resembled milk in its gross appearance, but, when examined microscopically with a high power, was found only to contain micrococci. The abdomen was opened and washed out, and the child is living to-day. I do not believe your purgative or opium plan of treatment would have cured that case. Mr. Tait professes that he does not fear the introduction of germs into the peritonaeal cavity, yet he puts in a drainage tube to remove them. Certain views of this type require further investigation, according to approved scientific methods. Dr. Ernst has shown us that a large class of peritonaeal inflammations owe their causation to infective material belonging to bacteria, which grow at the expense of, and greatly endanger, if they do not actually take, the life of the patient. If we continue our work in this line, we shall be able to differentiate our cases more clearly. I think all will agree with me that the last ten years have greatly helped to clear up this subject. The record of many laparotomies shows the safety of exploratory incisions; and hence, if we do not know the condition we have to deal with, we ought to know. We should know more to-day than even that great diagnostician, Alonzo Clark, to whom such frequent allusion has been made. If our sons come to discuss this subject fifteen years from now, it is probable they will think our opinion of to-day of but very little value compared with their own.

Dr. T. D. Strong, of Chautauqua county, said that quite early in his professional career he encountered an epidemic of puerperal peritonitis. At that time the treatment and views of Dr. Clark were first being promulgated, and they made a great impression upon his mind. Two remarkable cases had especially directed his attention then to this sub-

ject. A woman was just recovering from puerperal peritonitis, when two of her children, the only ones remaining in the house during their mother's illness, were taken down with apparently the same form of peritonitis. It seemed absurd to speak of these two cases as puerperal, but there was absolutely no other exposure. One of these children was a girl, eight years old, and the other, a boy of ten years. This boy had about the most desperate attack of peritonitis which he had ever met, and which had recovered. At this time he became quite daring in the use of opium in peritonitis. The tolerance exhibited to this drug is to a certain extent the measure of the severity of the disease. He gave this boy half a grain of morphia every hour, until, in a period of thirty-six hours, he had taken, by actual weight, eighteen grains. Every hour of this time he was bright, did not sleep a wink, and constantly complained of pain. At the end of thirty-six hours he began to doze, and from this time the improvement was slow but steady. The patient is to-day a vigourous, healthy man. Since that time the speaker had not been afraid of opiates in peritonitis. Had he treated the case by endeavouring to see how small a quantity of morphia he could use in the twenty-four hours, it was not likely that the patient would have recovered. It is a comfortable treatment, but more is necessary than simple comfort in acute diffuse peritonitis.

He believed there was an absolute necessity to put the intestines and the organs of the abdomen in splints. He did not know how to treat inflammation without rest, and certainly rest was necessary in this disease. Nothing short of the sedative effect of opium is of any use, except for the simple comfort of the patient; the sedative effect alone will control the inflammatory action. As soon as nature takes the case in hand, she will put the intestines in splints, with or without opiates. After this spasm has been relieved, cathartics are for the first time of use; in fact, the opium itself acts as a cathartic by relieving this spasm. Whenever in consultations he met a physician who was too timid to carry out the opium treatment in its *entirety*, he left the bedside with the conviction that the patient's doom was sealed.

Dr. E. G. Janeway, of New York county, closed the discussion. He stated that the subject of peritonitis had been so fully covered by the gentlemen who had preceded him that he had only a few words to say. The diagnosis of acute peritonitis is at times extremely difficult. Tympanitic distention of the bowel may be present, as well as pain and fever, without any peritonitis, and it was only by closely watching these cases that a correct conclusion could be reached.

A boy, four years old, suffering from high fever and constipation, had pain in the right iliac fossa, and so much tenderness that it was necessary to examine him under chloroform. This condition continued for

four days, all the symptoms pointing to peritonitis. On the fourth night he slept well, and the next morning his temperature was 99°, and in two days more he was well enough to go out. A pneumonia or a pleurisy may produce reflex pains over the abdomen, with marked distention. The symptoms of peritonitis may also be simulated by hepatic colic, and more rarely by renal colic. In this latter condition, we may get the fever, distention of the abdominal walls, and the pain. Then, again, there will be cases of peritonitis accompanied by diarrhoea without fever, and with but little pain.

FORCED RESPIRATION: CONTINUED OBSERVATIONS.

By George E. Fell, M. D., of Erie County.

October 28, 1891.

In the volume of Transactions of this Association for the year 1888, I published my first extended article on the subject of forced respiration, detailing the result of its use in six cases, with the saving of three lives, and the conclusions drawn from the experience obtained in this, at that time, practically altogether untried field. Since my last paper to the Association, published in volume 6, page 316, considerable progress has been made; more light from personal experience has resulted in demonstrating, in a more exact manner to my mind, the value of the different methods which I had formerly utilised and recommended. I then reported the saving of five human lives at my own hands, and one by a foreign physician, by the tracheotomy method, and had prepared and demonstrated in actual cases the value of the face-mask, which would do away with the necessity of performing tracheotomy, except, perhaps, in the more severe cases.

I can now add to my list three lives saved—in two instances with the face-cup alone, and another, with face-mask and tracheotomy combined. In addition, I now have the pleasure of stating that lives have been saved by several physicians who have utilised my methods. To sum up the grand work accomplished, no one can feel that his life has been spent in vain, when, from the result of methods first practically introduced to the medical world by him, he can point to the saving of fourteen human lives which otherwise would have been sacrificed,—which the combined methods of procedure in use by the profession the world over, at the time, could not have accomplished. With such results, would it be

chimerical to expect that this method of artificial respiration, instituted by an American, when utilised generally by the profession, would, in the near future, be credited with the saving of more human lives than the very much lauded methods of foreign investigators in other fields?

Forced respiration has a wide range of operation, and has not yet come into use in fields to which it is admirably adapted,—as drowning, asphyxia from various causes, as well as morphia, the tiding over of many conditions, and in cases of traumatic shock. When it is so utilised, will it not, and have we not good reason to expect from the past results that it will, be among the most important methods in the saving of human life ever introduced to the world?

Regarding its value in shock, I wish to say a few words at this point. The amount of nervous energy required to keep up auto-respiration is considerable. We respire unconsciously, without comprehending the central force required to keep the breathing mechanism in operation. This was clearly noted in my last case. It was very difficult to make the patient breathe for herself; it appeared to be a great effort to overcome the depressed condition of the respiratory centres, even with consciousness existing at the time. That this energy—so valuable in a critical case—can be conserved, and expended in retaining life, by respiring for the individual through forced respiration, no one will gainsay who has witnessed a serious case. I believe it will yet be generally utilised for this purpose, and I shall not feel satisfied that my grounds of belief are erroneous, until I have had a practical opportunity of demonstrating to my own satisfaction that such is the case. Remember, that I base my convictions on result of actual demonstration on human beings.

In a great centre of medical opportunity, like this, there should daily be numbers of cases typically suitable to demonstrate the truth or falsity of my views. For instance, given a case of double amputation, or railroad injury, in which the shock is severe and likely to prove fatal, or in which the

prognosis is fatal: try the face-mask; if it fails, resort to tracheotomy or intubation. I am ready to test the matter, if you give me the case. However, we need not dwell on the possibilities of this operation, as the record of work already accomplished is encouraging enough.

Now that this record is one for any person to be proud of, it is not strange that there are some who are desirous of questioning my right to originality in the practical applications of the method, and which I distinctly claimed in a former address on the subject, given before the Medical and Surgical Association of Buffalo, N. Y., and in other papers.

An article in the Journal of the American Medical Association, May 9, 1891, called attention to an apparatus prepared in England in 1822 for the purpose of keeping up artificial respiration by a face-piece applied to the nostrils. As my answer to this letter places the whole subject "in a nutshell," and explains clearly my work, its import, and results, I cannot do better than repeat it here, where I have found congenial souls to do me justice:

To the Editor [of the Journal of the American Medical Association]:

Your correspondent, Dr. Herzog, of Hoboken, N. J., leads me to believe, from the tenor of his article on "Forced Respiration," in the May 9th number of the Journal, that he has not read my address upon this subject with the care which it deserved. Had he done so, I am inclined to believe that so much of the valuable space of the Journal would not have been given to the elaborate account of an instrument which undoubtedly was never used to save human life, or, if it had been, would likely have failed ingloriously. I will not now be surprised if some one should add that Hippocrates had thought of forced respiration, and even devised an apparatus to perform it with. John Hunter did both, and possibly others, but we have no record of any of those noted men having applied their invention to the saving of human life. See Prof. Horatio C. Wood's remarks in his address before the Berlin Congress, in which he says,—"But I have not found that either Hunter or Richardson treated by forced artificial respiration an actual case of disease or poisoning."

In all this apparatus a grave defect existed, in my opinion, in that provision was made to exhaust the air from the lungs. This compli-

cates the apparatus, and, furthermore, is not in accord with physiological conditions,—as inspiration is a forcible measure, while expiration, being passive and produced by the elasticity of the fibro-elastic tissue of the lungs, does not call for the utilisation of mechanical means to produce it. I also believe that an apparatus provided with means for exhausting air from the lungs would prove a very dangerous instrument to place in the hands of the average physician in an emergency case.

However, no one will question that Richardson, Hunter—the designer of the apparatus mentioned in Dr. Herzog's letter—and several others whom I could cite, have prepared or invented instruments for forced respiration upon human beings.

With all their labour, what did they accomplish? Was a single human life saved by them? Did they demonstrate the wonderful possibilities of the method? Let us see. After my first operation with the instrument used in my physiological laboratory, and with which, notwithstanding its defects or adaptation for the purpose, I had succeeded in keeping my patient alive for nearly three hours until he breathed for himself, I looked up the home and foreign literature on the subject. Nothing was discovered which appeared to controvert the fact that I was justly entitled to the credit of being the first to systematically and practically solve the question of the value of forced respiration in the saving of human life; or that I had demonstrated, as one physician puts it, "that air can be forced into the lungs without any damage to them." Whatever has been acccomplished, also should be stated, was without any previous knowledge of the failures in the same field which antedated my efforts.

I can say, with the practical knowledge obtained from operating upon human beings, that the instruments used in the physiological laboratory do not meet the conditions to be successfully overcome in breathing for a human being for any length of time. They may answer in some instances as a makeshift, but the work is carried on at a great disadvantage, and with many chances in favour of producing, instead of averting, a fatal result. They were never intended to be used upon human beings. The instrument originally devised by myself in all its practical details, and with which the results detailed at the end of this letter were accomplished, was founded upon the experience obtained in my first case, and the results of my labour with it so overwhelmingly annihilates any controversy in opposition to its use, that it is needless to do more than present them to the profession. Had similar results or demonstrations been accomplished at the hands of others in the past, nothing could have prevented them from receiving the widest publicity in the medical literature of the day, but no record is found which detracts from the practical value and originality of my labors. As a physiologist, I was acquainted with the apparatus used in the physiological laboratory, from the simple

bellows with nozzle poked into the trachea of a dog, to the more complicated, constant Sprengle blower with interrupter, which admittedly would be of no use as an emergency instrument.

The apparatus I have used meets all requirements for forced respiration in man, with or without tracheotomy, and in the simplest manner. It covers all the methods which can be utilised in the operation, is adapted to be used out of doors or in a cold atmosphere, but may be modified by an arrangement to provide a constant air-supply and automatic inspirator, which would, however, increase the cost, and do away with the emergency feature of the apparatus as now used.

Dr. Herzog's article, possibly without intent, would naturally lead to the inference that the subject is old, not worth considering: its tenor is not uncertain. The truth is, that the work in forced respiration, prior to my own and running through the past century to a great extent, had simply relegated it to the list of unjustifiable procedures. Do we find anything previous based upon results recommending us to use forced respiration after all other methods of artificial respiration had failed? On the contrary, we do find in every medical work treating on the subject, the "Ready Method in Asphyxia of Marshall Hall," the highest accepted authority, that we must avoid the use of bellows or any forcing instrument.

Now I propose to talk plainly, as it seems entirely unnecessary at this late date to mince words upon this subject. The practical introduction to the world of the value of forced respiration in the saving of human life, both by tracheotomy and per face-mask, the demonstrations which indicated its great possibilities, must be accredited to an American; also that the work of others in the past had nothing to do with the results, which were original in conception and practical application.

The question simply amounts to the difference between failure and success: Will the credit be accorded to those who failed, or to the one who succeeded? If Columbus had prepared his ships but had not sailed across the Atlantic, would he have discovered America?

What also must be admitted, by those who are inclined to accord justice to whom it is due, is, that the practice of vivisection in the colleges and laboratories of the land had no relation whatever to the saving of human life, nor had it ever been taught in medical institutions, systematically or otherwise, as of any value in saving human life. For over eight years prior to my first operation of forced respiration upon a human being, I had been a practical vivisectionist in the physiological laboratory, and during that time I never heard it even hinted that a human life might be saved by the laboratory methods.

It was in the field of paralysis of the respiratory centres from opium that I began my work with forced respiration, and the demonstrations as to its efficacy from the first could not be questioned. Each and every case saved had passed beyond the limit of hope so far as all known and

systematically applied methods of resuscitation were concerned. To be denied the credit which should in all fairness be accorded to the practical originator of a method of such far reaching importance in the saving of human life is what I could not quietly submit to. "Honour to whom honour is due. . . . . "

Since this letter was published I have seen no publications questioning my rights to the claims of originality. However, through the kindness of Dr. Thos. H. Manley, of this Association, I am enabled to refer to an article in the Proceedings of the Paris Academy of Medicine, under date of June 2, 1891, in which Dr. J. V. Laborde, in a discussion on "Anaesthesia" regarding the dangers of chloroform narcosis, recommends forced respiration, and has devised a face-mask with which to perform the operation. This face-mask is of metal, with the edges surmounted or faced with rubber, and includes the nose and mouth. It is, to "all intents and purposes," similar in essential details to the one I have been using for some years, and with which I have saved a number of lives. Dr. Laborde speaks of his invention as novel, of great future value, declaims on the subject never having been brought up for discussion, etc. All the members of this Association, who have been acquainted with my work for the last four years, will agree that our Paris physicians can well afford to look Westward to learn that progress is not confined to continental Europe. It is quite strange, also, that Dr. Laborde has overlooked the statements of Prof. Horatio C. Wood, in his address on "Anaesthesia" before the Berlin Congress, 1890, in which he distinctly calls attention to my face-mask, and which I had been using for two years previously.

I am also astonished by the statement in the Paris Academy report, that noted French physicians have been using my method by tracheotomy with remarkable success, and without giving any credit for its practical introduction to the world from this side of the Atlantic.

At the Paris Exposition of 1888 one of my instruments was exhibited by Mr. George M. Bailey, of Buffalo, N. Y.,

who requested the privilege of taking it abroad. He had with him reprints of my articles published in the Transactions of our Association, which were distributed among some of the physicians and jurors interested officially in the exposition. At that time they took no notice of my work, but appropriated it, utilised it, and now claim originality for methods which I long ago utilised and first recommended in practical shape to the medical world. Comment is superfluous.

Dr. Wood, in his address upon "Anaesthesia" mentioned, referred to my apparatus as being unnecessarily costly and complicated, with which opinion I must respectfully disagree. In lieu thereof, Dr. Wood suggested an apparatus of his own devising as more simple and less costly, giving the impression to those unacquainted with the simple and practical features of my apparatus that forced respiration was a very simple matter. He suggests simply "a pair of bellows of proper size, a few feet of India-rubber tubing, a face-mask, and two sizes of intubation tubes. There should also be set in the tubing a double metal tube, with openings so placed that their size can be so regulated by turning the outer tube (similar to that commonly found in the tracheal canula of the physiological laboratory), so that it is in the power of the operator to allow for the escape of any excess of air thrown by the bellows."

Now let me kindly criticise: With such an arrangement it might be possible to keep up respirations on a human being, but the old-fashioned arrangement used on dogs in the colleges would be better and safer, as by turning the stop-cock you could immediately shut off air from the bellows, whereas with the apparatus which Prof. Wood recommends you would require to stop the bellows during expiration, or the air could not pass out of the lungs; then start them, force the air the whole length of the tube between bellows and lungs, and then stop for the next expiration, and so on. Exact and immediate control of the air, as in my apparatus —a very important matter, I can add—would be difficult to obtain. Furthermore, the resiliency obtained by the rubber

dam in my apparatus, an important detail, could not be applied to Dr. Wood's scheme. I feel that in suggesting so crude an apparatus, the worthy professor is giving forced respiration a stab in the back, which undoubtedly was unintentional. That valves differing from the one I have used may succeed, I cannot question. I have invented several that might work more easily, but they should all be arranged to exercise the most complete control over the column of air passing to the lungs.

If Dr. Wood desires a simpler, yet more crude, apparatus, which might possibly be utilised in saving human life in the absence of a complete apparatus, I can readily indicate one, but most emphatically do not recommend it to any one who values his peace of mind or physical comfort in the performance of forced respiration. However, never permit a human life to be sacrificed for want of forced respiration when you can procure a rubber tube of suitable size, a face-mask, and bellows of ordinary form. Connect the rubber tube with the face-mask, make a circular opening in the tube about eight inches from the mask, and connect the other end of the tube with the bellows. After placing the face-mask tightly upon the face of the patient, close the opening in the tube with the forefinger of the left hand, work the bellows once or twice for inspiration, then stop and remove the finger from the opening in the tube, which will permit the expired air to pass out of the lungs together with the excess from the bellows, then replace the finger on the opening of the tube for the next inspiration, and so on.

It is with a feeling of hesitancy that I mention the possibility of keeping up forced respiration with so incomplete an apparatus, and it is only suggested for an unusual emergency. It might save life where artificial respiration would fail. But for careful work, an arrangement like that I have formerly used is efficacious, without the dangers which might arise in the use of a crude arrangement. It must be remembered that the success I have met with has depended to a great extent upon the completeness of the outfit used. To be

supplied with incomplete apparatus would certainly result in failure in many cases. Note Case XVII,[1] which, without tracheotomy, would have caused a life to be sacrificed.

I will now add the following cases to those presented in Vol. VI of the Transactions:

Case XI. Dr. Fell, Buffalo, N. Y. A young woman had taken one or two ounces tr. opii. Artificial respiration failed. Forced respiration for four hours, with face-mask, saved patient.

Cases XII, XIII, XIV. Dr. C. R. Vanderburgh, Columbus, Ohio, reported three cases saved by face mask.

Case XV. Dr. Fell, Buffalo, N. Y. A woman had taken an uncertain amount of morphia—a large amount, however, as was evident from the effect produced upon her. About midnight a physician was called, but refused to attend, so that she was under the influence of the narcotic all through the night, until about 10 o'clock the next morning. I was called at 9 a. m., and arrived about 9:30. I ascertained there was no pulse at either wrist, but on auscultation found the heart faintly acting, cyanosis deep. I then had her placed upon a mattress in an adjoining room, and with the face-mask, air-control valve, and the bellows, went to work. It was fully an hour and a half before the pulse at the wrist could be detected. The woman became conscious, sat up, and asked for a drink. In the middle of the afternoon Dr. Porter came in to witness the operation, and offered his assistance, which was accepted. It may be stated, that when a person is very deeply narcotised, with forced respiration we may occasionally produce a conscious condition, but the patient will again pass under the influence of the narcotic, and become utterly unconscious. You may breathe for him for half an hour at a time, yet there will be no evidence of life except the action of the heart and the fact that the blood is supplied with oxygen. So this patient would occasionally become conscious. During one of these conscious periods, Dr. Porter, who had been standing in one corner of the room, came forward and began to perform Sylvester's method of artificial respiration, with the object, I presume, of demonstrating that it would accomplish as much as what I was doing. He understood how to apply that method from previous experience. All watched the result with interest. In a little while the cyanotic condition began to appear along the face, gradually becoming deeper and deeper. I said, "Doctor, you see now just what the result is."

"Yes," he said, "there is no question about it."

We then renewed the forced respiration with the face-mask. In a short time the cyanotic condition disappeared, and the woman again

[1] See list of cases.

became conscious. I kept up forced respiration with this woman until she revived again and began to be in quite a jovial condition, and as I thought, was perfectly safe. Then Dr. Porter desired to try the Faradic battery, which I consented to, regarding the woman's condition as such that, were it necessary, we could at any time rely upon the forced respiration again. I was anxious, of course, to report this as another case of life saved by forced respiration. After breathing some eight hours, and carrying the case through the most critical period, we called the Faradic battery into play. But what is the result of faradisation in a case of that kind? Merely the stimulation of the heart at the expense of its energy. However weak the current may be, if you obtain any heart action it is of a tonic nature, and is secured at the expense of the energy of the heart muscle. What we need to look out for in such a case is to conserve the ehergy and the vitality of the heart muscle. In this case the result was, that in about three quarters of an hour after the faradisation began, the heart stopped beating, spasmodically. The case was lost through faradisation.

Case XVI. Hospital case reported as saved by the Fell method. Particulars not obtained.

Case XVII. Dr. Fell, Buffalo, N. Y. Sunday morning, March 1, 1891, at 3:20 a. m., I was called to the residence of Dr. Harrington, on Franklin street, and there found a young lady who had taken a large dose —about fifteen grains—of morphine. At 3 a. m., Mr. Harrington, Sr., had noticed stertorous breathing. He arose, looked at the patient, but concluded it was nothing more than a very deep slumber. The condition continuing, however, he called Dr. Harrington, who examined the patient, finding her in a comatose condition, cyanotic, pupils markedly contracted, and a bottle of morphia upon the table. She had written two or three letters which clearly indicated the cause of the trouble.

I immediately proceeded to forced respiration with the face-mask, which resulted in overcoming the cyanosis and producing an improvement in the heart action. We continued forced respiration with the face-mask until 6:30 a. m., when it was observed that the cyanosis was again increasing, and the condition of the patient growing more and more desperate. No evidences of consciousness were present. By shouting into the ear, ocular reflexes were noticed in a contracting of the orbicular muscles. There appeared to be no hope of recovery at this time.

With Dr. Harrington's assistance we made tracheotomy, and inserted the tracheotomy tube, as arranged for forced respiration, into the trachea. Connection was then made with the apparatus, and forced respiration kept up. The improvement on the employment of forced respiration by tracheotomy, over that produced by the face-mask, was evident. The chest movements were greater, and the results were more satisfactory in many respects. However, of so serious a nature was the condition of the

patient at this time, that not one present expected other than a fatal termination. No pulse existed at either wrist; auscultation could detect no heart movement, either by Dr. Harrington, myself, or the students present. Two conditions, however, appeared to indicate that life was not extinct: the pupils continued contracted, and cyanosis did not supervene. The glassy stare of the eyes was present, and outside of the two favourable conditions mentioned, it appeared that death could not be far off.

At this point Dr. Harrington's father made the remark, that if this young lady was made to live, it would be indeed "a miracle." However, I kept up the forced respiration, saying that I would do so a little while longer, "just for the fun of it." In a short time auscultation on the part of Dr. Harrington gave us the satisfactory information that the heart was beating. In the course of a few hours these reflexes were more and more marked, and consciousness supervened. Forced respiration was continued through the forenoon, and until quite late in the afternoon, making some twelve to fourteen hours of continual forced respiration before the patient could be allowed to breathe for herself. She has made a good recovery. In this case artificial respiration would at no time have been of any avail to the patient.

Case XVIII. Dr. Fell, Buffalo, N. Y. Sunday, March 15, 1891, at 11:30 a. m., I was called to attend Joseph Altiere. A prescription containing phenacetin, morphine, and cocaine in small quantity, had been prescribed by the attendant physician for neuralgia of the stomach. The patient had taken repeated doses, without regard to instructions upon the prescription, until a large, poisonous dose of these very dangerous drugs had been taken. At 11:30 a. m., forced respiration with the face-mask was commenced, and quickly overcame the marked cyanosis, which was intensified undoubtedly by the phenacetin. With the face-mask forced respiration was kept up all the afternoon, the patient at times becoming conscious. The cyanotic condition seemed, however, to increase, owing to the base of the tongue falling back and occluding the larynx. A ligature was placed through the tongue, and the organ was pulled well up, with the result that the lungs were more readily inflated.

In this case, oxygen gas was administered, in connection with the forced respiration apparatus, it being supplied in greater or less quantities, as seemed to be desirable. At times the amount of air passing to the stomach and bowels was so great as to markedly distend them, thus interfering to a certain extent with the inflation of the lungs by the forced respiration, and indicating one of the difficulties to be met with in forced respiration with the face-mask. In the afternoon the patient became comatose, and responded very little to the respiratory work. During the evening it was evident that the patient was not progressing satisfactorily, the influence of the poisons being peculiar in their action, —there not appearing to be any elimination of the drugs, although the

catheter was used as often as was necessary, and the antidotes which seemed to be indicated, and stimulants, such as digitalis and alcohol, injected hypodermically. At 10 p. m., Sunday night, I made tracheotomy, and forced respiration was then kept up by the direct method. The result, as in the former case, indicated the very great readiness with which the method could be used in the inflation of the lungs; and the patient was apparently holding his own. I left for home at 11 p. m., trusting that the patient would be in good condition in the morning. An army of students was present to assist in the work of respiration, and with Dr. Harrington they kept faithfully at work through the night, until 5:30 in the morning. At this time the patient was breathing with comparative ease, and the prospects looked encouraging. However, a spasmodic contraction of the stomach occurred; its contents were ejected with force. Every effort was made to prevent any of the vomited matter from passing into the lungs, but the spasm resulted, however, in the ceasing of the action of the heart; and the labor of eighteen hours was lost.

The necessity for something other than manual labour in the forcing of a column of air into the lungs was strongly demonstrated in this case. Although there were plenty of persons present—the students, and the relatives of the patient—who performed all the labour required, no one who has not witnessed a case of forced respiration can really appreciate the amount of energy expended in respiring for a human being, be it even so easy comparatively as by the method used in forced respiration.

This is the first extended case in which oxygen gas was administered in conjunction with the forced respiration. The results were satisfactory, but the odds against which we were fighting—the combination of deadly drugs which had been taken—were too much for even an expectation that success would crown our efforts. With morphia alone in large quantity, I believe the patient would have been saved.

Case XIX. Dr. Fell, Buffalo, N. Y. The value of forced respiration as a tiding-over measure in various conditions, was exemplified in the following case. An old lady, seventy-three years of age, had taken, through the carelessness of a druggist, a dose of aqueous solution of corrosive sublimate. Its influence on the nerve centres produced shock; cyanosis was present, and death, which seemed inevitable, would soon have ensued. Forced respiration with the face-mask, easily applied, toned up the system, respiration was much improved, and the patient lived about two days longer for the treatment.

Case XX. In the surgical clinic of Dr. Hal. C. Wyman, Detroit Emergency Hospital Reports, reported by Dr. Robert S. Linn under Fell's Operation for Morphine Poisoning, as follows:

"Miss C., aet. 21. Had taken 20 grs. morphiae sulph. about one hour before ambulance was called. Her condition when brought to Emergency Hospital was critical. Pupils were much contracted, and did not respond

to light. Respirations were only five a minute and pulse quite weak. The stomach was evacuated of its contents with stomach pump, and about one pint of strong coffee injected into it. About 16 oz. of urine were drawn from bladder. A hypodermic injection of atropiae sulph. (grs. 1–60) was given, and artificial respiration performed without benefit. An incision 2 1-2 inches long was made in median line over the trachea, tracheotomy performed, forced respiration kept up for about three hours, and the life of the patient saved."

Case XXI. Dr. Fell, Buffalo, N. Y. I was called by Dr. Eli H. Long to attend a case of opium narcosis in a lady seventy-eight years of age. She had taken a large quantity of gum opium. Respirations shallow, fourteen per minute, pupils contracted, coma existing. Face-mask applied and used about eleven hours, when tracheotomy was made, but too late to save the patient. Convulsions set in, and continued interruptedly until death ensued. A mistake was made in this case in not performing tracheotomy earlier. With the face-mask the cyanosis was not satisfactorily overcome. Extension of the head, which was used with success for a time, had finally no influence in raising the epiglottis. A ligature through the tongue, by which the base of the tongue was raised, worked better. The cerebral hemispheres were greatly congested. Free venesection would have been beneficial if performed in season. The indications for tracheotomy existed for some time before it was made.

Case XXII. Dr. Fell, Buffalo, N. Y. I am under obligations to Dr. Allen A. Jones, Instructor in Practice, Medical Department University of Buffalo, by whom I was called, for the following report of this case, in which the face-mask demonstrated again its great value in a typically appropriate case:

"About 4 o'clock on the afternoon of Thursday, October 8, 1891, I was hurriedly summoned to the house of a former patient, and found her lying on a sofa unconscious, extremely cyanosed, her lips and ears being blue; her pupils were contracted almost to pin points, and her respiration was of the Cheyne-Stokes character, ceasing entirely for two or three full minutes, then coming with peculiar groanings and whistlings which died away until respiration ceased.

"I had been told over the telephone that she had taken morphine, but I did not know how much.

"Her pulse was frequent and small, but yet of good strength when I first arrived. I sent for Dr. George E. Fell without delay, with instructions that he should bring his apparatus for performing forced artificial respiration.

"While awaiting his arrival, with the help of those about me, I succeeded in restoring some colour to the lips by artificial respiration (Sylvester's method). The pulse grew weaker and weaker, and the heart almost ceased beating before Dr. Fell arrived.

"It was impossible to give emetics per orem, so we gave one fifth of a grain of apomorphine hypodermically, as soon as Dr. Fell arrived. Then with the patient on a table we instituted forced respiration (by face-mask).

"The patient's lungs filled easily and well without tracheotomy.

"We breathed for her steadily for about one hour, and then she moved her hands to her face and opened her eyes. Her cyanosis had entirely disappeared, and good oxygenation was manifest. The face-mask was taken off, and the patient breathed for herself in a long, slow, sighing fashion several times, but ceased entirely at the expiration of a few minutes. The lips turned blue once more, and she would inevitably have died had we not recommenced forced respiration again. Very soon she was again able to breathe alone, and temporarily stopping the forced respiration, we gave her mustard water, and she vomited profusely. We repeated the mustard water, but she did not vomit; her head fell back, respiration ceased, and again she was turning blue when we applied the face-mask and used forced respiration for the third time.

"After a short time we succeeded in inducing her to swallow another large cupful of warm water and mustard with a teaspoonful of salt in it, with the result that she emptied her stomach completely.

"As is common in conditions where the respiratory centre is benumbed, emesis seems to stimulate that centre, and respirations were more willingly taken. Even at this junction, however—being about two and one half hours from the time that forced respiration was commenced—she would certainly have died had it not been continued, as it was, altogether for four hours. At the expiration of that time, she breathed herself seven times in the minute, and in the morning her respirations were 20, her pulse 80, temperature 101°.

"Dr. Herbert U. Williams, who kindly remained all night with the patient, stated that the pulse gradually fell, and the respirations gradually increased, from hour to hour, that he gave her a hypodermic of atropine (one one-hundred-fiftieth of a grain), of strychnine (one sixtieth of a grain), and of tincture of digitalis (fifteen drops), about 11:30 p. m. At 1:30 a. m. she had a cup of strong coffee, and a glass of warm milk at 2 a. m. At 2:30 a. m. she urinated freely.

"This patient said she took eleven grains of morphine dissolved in a glass of water at 1 o'clock on the 8th. I saw her at 4; Dr. Fell arrived about 4:30; we performed forced respiration until 9 o'clock, with the result that the woman's life was saved.

"I am convinced that ordinary artificial respiration would not have saved her life. and I cannnot speak in too high praise of Dr. Fell's effectual and simple apparatus for forcing such a patient to breathe, if necessary, for many hours in succession. I think more physicians ought to possess and have in readiness Dr. Fell's apparatus, and many lives would easily be saved, where now they are lost because no such facility is at hand.

"It is interesting to note in this case that diplopia existed from the return of consciousness on Thursday evening until some time Saturday morning; and for four days the patient thought a cup of food, or whatever it might be in her hand, was held at the lips, when in reality it was four inches from them, and at first she poured out milk and tea upon her dress."

The result up to the present time, October 9, 1891, presents twenty-two cases, all of a most desperate nature. Of these, fourteen have been saved through forced respiration alone, or when all other agents combined, without the aid of forced respiration, would certainly have failed.

In closing, I wish to add that the excessive conservatism, however, of the medical profession crops out, here and there, to retard progress. In a foot note, "Tables for Doctor and Druggist," by Dr. Eli H. Long, just published,[1] we find that "High authorities have pronounced forced respiration as no better than the usual methods of artificial respiration, but the experience [of Dr. Fell] would seem to place the method among the most effectual means at our command for resuscitation of seemingly hopeless cases of opium poisoning."

I will say, and most emphatically, that the high authorities referred to never knew anything about forced respiration. The so called high authorities may have failed through the use of incomplete and unwisely constructed apparatus, and consequently were not entitled to consideration in the face of a record like that I have presented. After my third case, all successful under most adverse conditions, one of our prominent physicians remarked to me that I had done enough, and could now retire on my laurels.

With the press almost daily recording cases of death from opium narcosis, which might have been saved had the methods presented over four years ago been utilised, with only five or six physicians of the ninety thousand in this country prepared, so far as I know, to use this method, it would hardly do to rest now. When I find the methods I have recommended utilised as they deserve to be by the profession at large, then, and then only, should I be justified in "resting my case."

[1] 1891.

ADDRESS ON SURGERY.

THE SURGICAL TREATMENT OF PYLORIC STENOSIS, WITH A REPORT OF FIFTEEN OPERATIONS FOR THIS CONDITION.

By Nicholas Senn, M. D., of Chicago, Ill.

October 28, 1891.

Stricture of the pylorus, sufficient in degree to give rise to obstruction, slowly but surely leads to a series of pathological changes incompatible with life, and death from marasmus will eventually result irrespective of the nature of the primary lesion which caused the stenosis. The progressive narrowing of the lumen of the pylorus causes retention of food in the stomach, which, failing to undergo proper gastric digestion, acts the part of an irritating foreign substance, and in a short time produces a diffuse catarrhal inflammation. The retention in the stomach of imperfectly digested food is followed by fermentation, which still further impairs gastric digestion, and adds another causative element in the production of dilatation of the organ. The accumulation of food, and the products of catarrhal inflammation in the stomach, increase as the pyloric outlet of the organ is diminished by the stricture, and dilatation is brought about by the weight of the stomach contents, the weakening of its walls by the secondary catarrhal inflammation, and by the elastic expansion of the organ by the gaseous products of fermentation. In chronic pyloric obstruction I have repeatedly evacuated from the stomach over a gallon of fluid, containing solid particles of food, through an elastic siphon stomach tube. In one instance fragments of the pulp of an orange were observed in this manner three months after the

orange was eaten, showing that when the stenosis has reached a certain stage solid fragments of food may be retained in the stomach, in an undigested state, for weeks and months. In reference to the secondary lesions of the stomach following pyloric stenosis, the train of symptoms is very much the same, whether the primary disease is of a benign or a malignant nature. Death eventually occurs, not from the disease which has produced the stricture, but from the secondary lesions which develop in consequence of the mechanical obstruction. Irrigation of the stomach, rational use of internal remedies, a carefully selected diet, the use of electricity, and massage exert a beneficial influence in the retardation of the secondary lesions caused by the obstruction. They are the most useful means which the modern physician employs in the treatment of such cases to prevent and combat the secondary lesions, but the employment of all these valuable therapeutic resources can at best only postpone, but not obviate, the inevitable fatal termination.

Stricture of the pylorus is a surgical affection, and should be treated as such, with the same right and for the same reasons as a stricture of the oesophagus, rectum, or urethra. Reliance on medicine is as deceptive and useless in these cases as in the treatment of stricture of any other organ. Permanent relief can only be secured by prompt surgical interference.

During the last ten years abdominal surgery has widened its field of application and usefulness, and now deals successfully with the surgical affections of every one of the intraperitonaeal organs. Gastric surgery has a short but eventful history. Within a few years hundreds of operations have been performed on the stomach for various indications, and many of them have proved eminently successful. Although the hopes first entertained in reference to the possibilities of extensive resections for malignant disease have not been realised, the results obtained by operative treatment for obstructive lesions have surpassed all expectations, and constitute one of the triumphs of modern surgery. It must not

be forgotten that gastric surgery is still in its infancy, and I am quite confident that in less than ten years from now the means for an early accurate diagnosis of the different surgical affections of the stomach will have been so much improved, and the technique of the different operative procedures will have reached such a degree of perfection, that surgeons will then deal with the different localised affections of this organ as successfully as the gynaecologist now does with the different affections of the uterus and its appendages. I propose on this occasion to discuss briefly the surgical treatment of pyloric stenosis. I shall divide the subject, in reference to the nature of the obstructive cause, into (1) Operative Treatment of Cicatricial Stenosis of the Pylorus; (2) Operative Treatment of Carcinoma of the Pylorus. With very few exceptions, stricture of the pylorus is caused either by cicatricial contractions following the healing of an ulcer in this locality, or by a carcinoma. It is very rare indeed to find obstruction here caused by other conditions, such as a non-malignant tumor, congenital stenosis, a twist or flexion.

1. *Operative Treatment of Cicatricial Stenosis.*

Cicatricial stenosis of the pyloric orifice of the stomach frequently follows as the remote sequela after the healing of an ulcer or traumatic defect in this part of the stomach. The development of the stenosis is a slow process, as it depends upon the formation and contraction of cicatricial tissue which is produced at the site of the former trauma or ulcer. The formation of an excessive amount of granulation tissue in a surface wound or ulcer of the stomach takes place in consequence of the continued irritation caused by the presence of food and digestive fluids, and on this account cicatricial contraction often follows the healing of a wound of the mucous membrane or ulcer of this organ. A cicatricial stenosis of the pylorus gives rise to symptoms of obstruction at this point—vomiting, retention of food, catarrhal inflammation followed by progressive dilatation of the stomach. Patients suffering from this affection are usually treated for

months and years for dyspepsia or indigestion, until a careful examination of the stomach reveals the existence of the obstruction and great distention of the stomach, when the diagnosis is often changed to carcinoma of the pylorus. The diagnosis of cicatricial stricture of the pylorus should be based on the clinical history of the case, which usually points to the existence of ulceration months and years before, the use of the siphon stomach-tube, and inflation. The clinical history usually reveals the existence of disturbed digestion years ago, caused by an unhealed ulcer, and later by the gradually increasing obstruction. For a time the compensatory hypertrophy of the walls of the stomach balances the mechanical difficulties caused by the stricture; but when this is no longer the case, the walls of the stomach become attenuated, and dilatation of the organ follows as a constant and inevitable result. At this stage the elastic stomach-tube is of great diagnostic value. By its use the over-loaded stomach is emptied of its contents, and the amount of fluid removed often furnishes valuable information regarding the degree of dilatation, while examination of the contents removed often reveals valuable diagnostic points. After the stomach has been thoroughly washed out, its size and location can be accurately outlined by inflation. Even when the stomach is in a normal condition, it can be fully distended by inflation from above, and, when the pyloric orifice has been diminished in size, very little, if any, air passes beyond it when the organ is distended for diagnostic purposes. Air should be forced through the stomach-tube slowly and uninterruptedly from a large rubber balloon, until the contour of the stomach can be outlined on the surface by inspection, palpation, and percussion, which will accurately indicate its size; but this method of examination will also determine accurately its anatomical location and relation to surrounding organs. When the dilatation is very marked, it is not uncommon to find the axis of the organ changed from horizontal to a nearly perpendicular line, and in such cases the great curvature is often found in the left iliac fossa.

The absence of a tumor in the pyloric region speaks in favour of a cicatricial stenosis, but does not preclude the possible existence of an annular malignant stricture. A cicatricial stricture of the pylorus is almost certain to lead to a fatal termination in from three to four years from marasmus, unless the mechanical obstruction is remedied by surgical interference, as a stricture in this locality always manifests an intrinsic tendency to progressive contraction, and finally completely interrupts the entrance of food from the stomach into the intestines. The operative treatment of a cicatricial stricture at the pyloric end of the stomach consists in pylorectomy, digital divulsion of the stricture through a wound in the stomach, in the formation of a partly new pylorus by the pyloro-plastic operation of Heineke-Mikulicz, or in establishing a new outlet from the stomach into the upper portion of the small intestine by making a gastro-enterostomy.

Pylorectomy.—The mortality of pylorectomy, even in the treatment of cicatricial stenosis, has been so great (about fifty per cent.) while the less heroic procedures have yielded equally satisfactory functional results, that we may take it for granted that this operation will be abandoned in the treatment of this form of pyloric obstruction.

Digital Divulsion of Cicatricial Strictures of Pyloric Orifice of Stomach.—In 1883, Loreta, of Bologna, introduced a new method of treating non-malignant strictures of the pylorus, and later published a number of successful cases. The operation devised by him consists in opening the stomach a little nearer the pyloric than the cardiac extremity, and passing first the right index-finger through the strictured portion, and later also the left, and then separating them, as he did in the first case more than three inches. Considerable force is usually required in dilating the stricture to this extent, and during such forcible stretching there is always danger of tearing through the entire thickness of the wall of the pylorus. The wound in the stomach is closed in the same manner as after gastrotomy for other purposes. The

stomach should be thoroughly emptied by irrigation with a mild antiseptic solution before the operation, and during the stretching process the visceral wound should be drawn well into the abdominal incision.

To the immediate risks of Loreta's operation, rupture of the pylorus and dangerous hemorrhage, must be added recurrence of the stricture, which is certainly one of the common remoter consequences, following treatment of cicatricial strictures by rapid dilatation wherever the stricture may be located. In this particular it can hardly be assumed that stricture of the pylorus constitutes the only exception. Notwithstanding that a number of successful operations of this kind have been reported, and the operation is being strongly urged by a number of able surgeons, notably by Barton, of Philadelphia, it will undoubtedly never be generally adopted, as it is really more dangerous and uncertain in its results than the pyloro-plastic operation of Heineke-Mikulicz, which for many reasons is sure to take the place of all other operations in the surgical treatment of non-malignant strictures of the pylorus.

Pyloroplasty.—The safest, and functionally most efficient, operation for cicatricial stenosis of the pylorus is the one devised by Heineke and Mikulicz nearly at the same time. It is a procedure which well deserves the name it bears, pyloroplasty, as it not only removes the mechanical obstruction, but at the same time creates a new pylorus. This operation was first planned and practised by Heineke, of Erlangen, and eleven months later Mikulicz, ignorant of Heineke's work, made the operation in exactly the same manner. The operation is made by cutting the anterior wall of the strictured pylorus, and extending the incision about an inch toward the stomach, and the same distance in the direction of the duodenum. The straight incision in the long axis of the pylorus divides the stricture, and the contracted pylorus becomes the posterior wall of the new pylorus by retracting the margins of the wound on each side, at the centre, with tenacula, and suturing the wound in an

opposite direction to the incision, that is, transversely to the long axis of the stomach. The new pylorus is made up of tissue, taken partly from the anterior wall of the stomach and partly from the duodenum, the posterior wall being composed of the narrow, contracted pylorus. In suturing the wound, it is advisable to tie the sutures from each angle of the wound, tying the central sutures last. Two rows of sutures, deep and superficial, are employed, the same as in closing a wound of the stomach or intestines. Recurrence of the stricture is a physical impossibility, as the new pylorus is composed mostly of healthy tissue, and the danger attending the operation is not greater than that which accompanies an ordinary intentional wound of the stomach or intestines. The results of this operation, obtained in eight cases which have so far been reported, have been very satisfactory both in reference to the immediate effects of the operation and the functional results. In this connection I will give the details of two cases of cicatricial stenosis of the pylorus, in which I employed this procedure, and in both instances with most gratifying results.

CASE I.—CICATRICIAL STENOSIS OF PYLORUS—PYLOROPLASTY—RECOVERY.—An account of this case was published by Dr. F. J. Groner, of Big Rapids, the attending physician, in the *Physician and Surgeon*, March, 1890. The patient was the Reverend Mother Superior of the Convent of Mercy, Big Rapids, Mich., aged forty-seven. General health good until the early part of the winter of 1888, when she began to suffer with symptoms which suggested the existence of pyloric obstruction. The usual treatment for indigestion proved of no avail. Vomiting at variable periods after eating was a conspicuous symptom, and was always followed by relief. On one occasion meat eaten one hundred hours before was recognised in the vomited matter. Vomiting commenced in March, 1889. The symptoms became greatly aggravated during the month of June. The use of the stomach-tube afforded great relief. In the latter part of May the patient consulted me, at the request of her attending physician, and from the clinical history and the symptoms then present, I had no hesitation in corroborating the diagnosis previously made by Dr. Groner—cicatricial pyloric stenosis.

The obstruction evidently became rapidly aggravated, so that even liquids were retained in the stomach. The patient's normal weight was one hundred and ninety-nine pounds, of which she lost fifty pounds during her illness.

The operation was performed, July 16, 1889, at the Mercy hospital, Big Rapids, Mich. I was ably assisted by Drs. Groner, Barth, Burkhart, and Bigelow. The patient was thoroughly prepared for the operation by washing out the stomach with Thiersch's solution. Chloroform was used as an anaesthetic. The great thickness of the abdominal wall made it somewhat difficult to bring the pyloric end of the stomach well forward into the wound. The pylorus was a circular mass of cicatricial tissue, its lumen not much larger than an ordinary lead-pencil. The incision was carried well toward the stomach and duodenum, in order to obtain sufficient healthy tissue for the new pylorus. The longitudinal wound was transformed into a transverse wound, and united by two rows of fine silk sutures. The lumen of the new pylorus was large enough to admit two fingers. She vomited several times after the operation, but this the patient attributed to the morphia which was administered. For twenty-four hours the stomach was kept perfectly empty. After this time liquid food was administered in small quantities at short intervals. No further untoward symptoms occurred, and the external incision healed by primary intention. Six weeks after the operation the patient resumed her ordinary duties, which consisted of superintending three schools, each fifty miles apart, and the trying task of presiding over two hospitals. Appetite and digestion at this time was perfect. The overwork brought on severe and obstinate attacks of intercostal neuralgia, which required morphine to relieve the pain. This late complication retarded materially the final complete recovery. In December the patient was in perfect health, and had regained her former weight. At present there are no indications of recurrence of gastric disturbance, and the patient continues her arduous work with the same energy and efficiency as before her illness. It is noteworthy to state that in this case the patient does not recall any symptoms which would indicate the existence of an ulcer of the pylorus at any time before the last illness, and yet it is almost certain that, probably years before, she was the subject of an extensive circular ulcer at or near the pyloric orifice. The stomach was only moderately dilated, and the walls, if anything, were thicker than in a normal condition. It is evident that the obstruction had existed for a long time, and had resulted in a compensatory hypertrophy of the coats of the stomach, and that at the time of operation dilatation of the stomach and attenuation of its walls were progressing hand in hand. I have no doubt that a few months later both of these conditions would have been greatly aggravated. A timely resort to operative treatment in this case prevented the full development of the remote secondary lesions following pyloric obstruction, and thus averted the serious organic changes which characterise pyloric obstruction of long standing, and which, under these circumstances, often never completely disappear, even after the stricture has been removed by operative treatment.

CASE II.—Cicatricial Stenosis of Pylorus following Recent Extensive Ulceration—Pyloroplasty without Anaesthesia—Recovery.—The second case of pyloroplasty was a Norwegian farmer, fifty-one years of age, who was brought to the Presbyterian hospital, in Chicago, by Dr. Boeckmann, of St. Paul, Minn., July 5, 1891. No hereditary tendency to carcinoma in his family. He states that he has been a confirmed dyspeptic for twenty years. Eight months before his admission into the hospital he suffered great pain in his stomach, which was always aggravated after meals. The pain was associated with a burning, scalding sensation in the stomach, which was most distressing several hours after meals. About this time the patient had an attack of profuse haematemesis, which almost proved fatal. The diagnosis made at this time was ulcer of the stomach. By restriction of diet, and occasional use of stomach siphon-tube, he obtained temporary relief; but for the last two months he has vomited repeatedly, usually some time after eating. At the time of admission the patient presented an anaemic appearance, and was greatly emaciated. No tumor could be detected in the region of the pylorus. Chemical examination of the contents of the stomach revealed the presence of hydrochloric acid. By use of the elastic tube it was ascertained that the stomach held at least twice as much fluid as in a normal condition. From the history of the case, and the symptoms and signs presented, I was ready to endorse the diagnosis of cicatricial stenosis of the pylorus, previously made by the attending physician. As the patient was very much debilitated, his pulse intermittent and irregular, I agreed with Dr. Boeckmann that it would be unsafe to administer an anaesthetic, and that if the patient's consent could be obtained it would be advisable to operate without anaesthesia. The patient readily agreed to our advice, and heroically submitted to the somewhat prolonged operation, responding to questions, and describing his sensations during its progress. As in the former case, the stomach was thoroughly washed out with a weak antiseptic solution just before the operation was commenced. The operation was performed on the same day he reached the hospital. The external incision was made through the median line, from the ensiform cartilage to the umbilicus. According to the patient's own statements this step of the operation caused the severest pain. The incision in the stomach and suturing of the visceral wound produced but little suffering. The stomach was found greatly dilated, its walls very vascular and considerably attenuated. The pylorus occupied its normal location, and presented, anteriorly, a tortuous and twisted appearance. The anterior wall presented otherwise a normal appearance. Digital exploration revealed a hard cicatricial mass, involving the posterior and upper part of the pylorus. An incision about two inches in length was made, parallel to the long axis of the stomach, with the strictured portion as the central point.

Inspection and digital exploration now revealed a cicatricial mass posteriorly and above the incision, involving about two thirds of the circumference of the pylorus, the lumen of which was contracted down to the size of a lead-pencil, and very much distorted. The visceral wound was treated in the same manner as in the foregoing case. Aseptic gauze was packed around the pylorus, and was kept in place from the time this part of the stomach was brought foward into the wound until the suturing of the visceral incision was completed. During the operation the patient complained of nausea; at the same time violent contractions of the stomach were observed, but vomiting did not ensue. The abdominal incision was closed by buried and superficial sutures. The operation lasted nearly an hour, and after its completion the patient was somewhat paler, but expressed himself as satisfied that the pain inflicted was not as severe as he had expected. Rectal alimentation was relied upon for three days, after which stomach feeding was resumed. The diet for a number of days was limited to liquid articles of food. The highest temperature observed was 99¾° F. The wound healed by primary union, and the patient left the hospital much improved in health at the end of twenty-five days. On several occasions the stomach-tube had to be used after the patient commenced to take liberal quantities of solid food, as digestion appeared to be somewhat impaired. I received a letter from him two months after leaving the hospital, in which he informed me that he had gained twenty-seven pounds in weight, and was able to digest all kinds of food without experiencing any distress. Only on a few occasions was the stomach washed out after he left the hospital, for fear that undigested food might aggravate the enfeebled condition of the stomach. As I have not heard from the patient since, I have every reason to believe that he has been free from a relapse. The points of interest in this case are the sex and age of the patient, the short time that elapsed since the ulcer formed and symptoms of obstruction appeared, the almost complete impenetrability of the pylorus by a cicatrix involving only two thirds of its circumference, and the fact that the operation was performed without the use of an anaesthetic. The complete impenetrability of the pylorus in this case was at least in part due to the tortuous course of its lumen.

The results obtained in the above cases, as well as a study of the literature on the different methods of operative treatment of pyloric stenosis, have led me to the conclusion that pyloroplasty is the safest and most successful operation in all cases in which pyloric obstruction is caused by cicatricial contraction. Pylorectomy in such cases is too dangerous an operation, and even if it should prove successful would not

yield as satisfactory functional results as the simpler and safer procedure of pyloroplasty. Digital divulsion of the stricture has been followed by a much larger mortality than pyloroplasty, and the remote danger of recurrence of the stricture, for obvious reasons, is much greater than in the latter operation. Gastro-enterostomy is attended by as much immediate risk to life as pyloroplasty, if not more, and the functional results can certainly not be as satisfactory as after pyloroplasty, because an important segment of the small intestines is permanently excluded by the operation from the process of digestion. As in the treatment of all other surgical affections of the gastro-intestinal canal, it is important, in order to secure good results, to operate early, before the obstruction has resulted in incurable secondary lesions; it is also important that an early diagnosis of the existence of pyloric obstruction should be made. For practical purposes, it is immaterial to make a positive differential diagnosis between benign and malignant obstructive lesions before the abdomen is opened, as in either case operative treatment of the obstruction is urgently indicated. The existence of pyloric obstruction can be ascertained with a reasonable degree of certainty by the complexus of clinical symptoms which attends this condition, and the diagnostic tests which demonstrate the increased capacity of the stomach and dilatation of this organ.

In reference to the presence or absence of hydrochloric acid in the secretions of the stomach as a test in the differential diagnosis between benign and malignant affection of the stomach and pylorus, Kinnicutt summarises the results of his investigations as follows: "The consensus of experience among clinical observers in various parts of the world is to the effect that free hydrochloric acid may be, and is, absent temporarily or otherwise in many gastric affections; that it is absent in a very large proportion of cases of cancer of the stomach; that its continuous presence is a diagnostic sign of great value in excluding the probable existence of gastric cancer."

2. *Operative Treatment of Malignant Stenosis of Pylorus.*

Myofibroma and other benign tumors of the stomach are extremely rare, and when present seldom necessitate surgical treatment. Sarcoma of the stomach, as compared with carcinoma, is so very rare that it is only necessary to speak briefly of carcinoma as a cause of pyloric obstruction in the consideration of malignant stenosis in this part of the stomach. It appears that in the stomach the general law is also observed, that carcinoma develops in preference where two types of epithelial cells meet. It is a well known clinical and pathological fact that in the stomach the disease has its primary starting-point, most frequently at the pyloric or cardiac orifice, and of these two localities the pyloric is, by far, the most frequently affected. Carcinoma of the pylorus gives rise to many symptoms which suggest the existence of ulcer and cicatricial stricture. This is more especially the case in circular carcinoma, which produces obstruction quite early by infiltration of the tissues and cicatricial contraction. As soon as the internal surface of the carcinoma ulcerates, haemorrhage into the stomach is of frequent occurrence.

It is not always easy, or even possible, to ascertain the existence or exact location of a carcinoma of the pylorus by any of the known physical signs or chemical tests. A circular carcinoma of the pylorus may cause death before its presence can be recognised by any known methods of physical examination. An infiltrating carcinoma of the pyloric extremity of the stomach may cause thickening of the walls of the stomach over a large area, and yet it may elude the most painstaking examination if physical signs are relied upon exclusively. In the majority of advanced cases of pyloric carcinoma, however, a distinct tumor can be felt in the pyloric region; but often the weight of the tumor has carried that part of the stomach in a downward direction, and then the tumor may be found as low down as the level of the umbilicus. Circular carcinoma of the pylorus often causes enormous distention of the stomach, the large curvature of which often reaches as far as the pubes. In such cases the

stomach is often placed in almost a vertical position—a condition which greatly aggravates the existing obstruction. It is often very diffcult to differentiate between a carcinoma of the pylorus and a retro-peritonaeal tumor in the same locality. Inflation of the stomach is the most reliable diagnostic procedure in such cases.

If the tumor is retro-peritonaeal, it becomes covered by the distended stomach during the inflation; the previous area of dulness disappears as the tumor becomes covered by the distended tympanitic stomach. If, on the other hand, the tumor is connected with the stomach, its relative position to the anterior abdominal wall is not changed by the inflation. A carcinoma of the pylorus may be suspected if a patient more than forty years of age gives a history of disturbed digestion dating back for several months or a year, combined with evidences pointing to pyloric stenosis. The chemical examination of the contents of the stomach for free hydrochloric acid, so much relied upon during the last few years in making a differential diagnosis between benign and malignant affections of this organ, has been found a valuable aid, but the results thus far obtained are not infallible. Haematemesis in persons beyond middle age, progressive marasmus, and enlargement of the cervical glands speak in favour of malignant disease. The surgical treatment of pyloric carcinoma consists either in removal of the diseased part by pylorectomy, or the formation of a new outlet from the stomach into the upper portion of the small intestines by gastro-enterostomy.

Pylorectomy.—A limited carcinoma of the pylorus, if it has not resulted in extension of the disease to adjacent organs or infiltration of the lymphatic glands behind it, furnishes a legitimate indication for a radical operation. If, however, the disease has extended beyond the walls of the stomach, pylorectomy is contra-indicated, and the surgeon must be content to render the obstruction harmless by establishing a new route by which the contents of the stomach can reach the intestinal canal. If the patient objects to an operation, life can be greatly prolonged and a great deal of

suffering prevented by placing the patient on a carefully selected diet, and by resorting to irrigation of the stomach as often as the retention of the undigested food may render this procedure necessary. Pylorectomy has so far not yielded results which would encourage surgeons to have more frequent recourse to it in the treatment of malignant stenosis. The great mortality of this operation and early relapses are easily explained by the fact that heretofore operations were usually performed after the patient's strength had been greatly reduced by the disease, and after extension of the disease to the surrounding organs or lymphatic glands had taken place. Statistics appear to show that the results have not improved much during the last few years. At the Berlin International Medical Congress [1] Billroth gave an account of twenty-seven pylorectomies, all of which were performed either by himself or his assistants. Of this number, twelve recovered from the operation and fifteen died. Of thirteen pylorectomies for carcinoma which survived the operation, five died after ten months, and one after five years and three months, after the operation, from recurrence. There were yet living three women at the time the report was made, of whom two had been operated upon two and one half and four and one fourth months. Of six resections of the pylorus for cicatricial stenosis, three recovered. These results, obtained by the ablest of living surgeons, certainly leave much to be desired, and cannot fail in influencing surgeons to limit the sphere of the operation to favourable cases. The proper time for pylorectomy will come when we shall be able to recognise carcinoma of the pylorus during its incipiency, at a time when the patient's general condition is such as to be able to resist the immediate effects of the operation; when this time has come, the mortality will be small and the relapses few. At present it seems to me that the operation is only justifiable where the patient's strength is fair, and where the disease is limited and has not passed beyond the organ primarily affected.

[1] 1890.

Gastro-Enterostomy.—Gastro-enterostomy is an operation by which an anastomotic communication is established between the stomach and the upper portion of the intestinal canal, with exclusion of the duodenum and sometimes a portion of the jejunum. This operation is performed as a curative or palliative measure in cases of pyloric obstruction, when removal of the cause of obstruction is impossible or not advisable. This operation was devised and first practised by Wölfler. Wölfler made an incision about three inches in length in the anterior wall of the stomach, at a safe distance from the carcinoma and near the great curvature, and a similar incision in the convex side of the intestine about thirty inches below the plica duodeno-jejunalis, and united these two visceral wounds with sutures, thus establishing a direct communication between the stomach above and the small intestines below the obstruction. In uniting the posterior margins of the wounds, the serous or superficial sutures should be first inserted, and tied when the inner or second row are tied, and cut short to the knot. Silk should be used exclusively as suturing material. In Wölfler's operation, the current of the intestinal contents is in a direction opposite to the peristaltic action of the stomach, a condition which necessarily must be unfavourable to the easy escape of the stomach contents into the intestinal canal, a circumstance which led Rockwitz to so modify the operation that he turns the intestinal loop one half around its axis and unites the intestine with the stomach in this position, and thus brings the two organs in such relative position that the peristaltic action of both takes place in the same direction. Von Hueker has modified the operation still further, and establishes the communicating opening in the posterior instead of the anterior wall of the stomach. The portion of intestine which should be united with the stomach is a point about twenty-four to thirty inches below the pylorus.

Operators have experienced a great deal of difficulty in finding this place without too great loss of time and unnecessary and harmful handling of the intestines. Luecke gave

the advice to seize and unite with the stomach the first intestinal loop that presents itself in the external median incision, and gave it as his opinion and the result of his experience that in doing so the anastomotic opening will invariably be made near the desirable point, not distant from the duodenum. This advice has led to serious mistakes. In one of the writer's cases, in which this direction was followed, the autopsy revealed the fact that the opening had been made eight feet below the pylorus, and in one of Lunenstein's cases the opening was found near the ileo-caecal region; consequently, nearly the entire length of the small intestines had been excluded from participation in the progress of digestion and absorption. In searching for the upper portion of the small intestines, it is not always easy, as has been claimed by Hahn and Kënig, to find the plica duodenojejunalis, and, as the result of quite an extensive experience, the writer recommends the following plan: The first loop that presents itself is brought forward into the wound, and is held in this position by an assistant, while the surgeon follows the intestine in one direction, observing carefully its colour and the thickness of its walls as loop after loop is examined. If the intestine leads in an upward direction, the colour becomes paler and the walls thicker, and the duodenum will soon be reached. If he is tracing the bowel in an opposite direction, the intestine becomes gradually smaller, its walls thinner, and the colour more of a bright red hue. Should this be the case, the loops of the intestine are returned, and the examination is made from the loop held by the assistant, in an opposite direction, which will soon lead to the part that it is intended to unite with the stomach. As soon as the desired loop is reached, it should be twisted around, as advised by Rockwitz, and held in this position by an assistant until the anastomosis has been completed. Of twenty-one gastro-enterostomies collected by Rockwitz, made for malignant and cicatricial stenosis of the pylorus, the mortality is represented by 57.2 per cent. Billroth reports twenty-eight operations for malignant pyloric stenosis, with

fourteen deaths. Of those that survived the operation, all died in from one to eight months. This great mortality is due to the debilitated condition of the patients operated on, and to the great length of time required in uniting the visceral wounds by suturing. Gastro-enterostomy, as heretofore described and performed, is an operation attended by many difficulties, and requires, even in the hands of an expert, an hour or more for its execution.

As this operation is only done in cases greatly debilitated by disease and long suffering, anything which will simplify the technique and shorten the time must be looked upon as an improvement. An operation that can be done in ten or fifteen minutes instead of in an hour or two, and which furnishes much better conditions for the healing together of the margins of the visceral wounds, must take the place of the more complicated procedures, which so far have only been practised in the hands of the most experienced surgeons. The author has modified Wölfler's operation by securing apposition between the stomach and the intestine by means of perforated decalcified bone-plates—a method which greatly shortens the operation and brings the parts in a more favourable condition for speedy union. The approximation-plates are reinforced by a number of superficial sutures in the same manner as in establishing an intestinal anastomosis. Scarification of the serous surfaces included by the plates will greatly hasten the formation of firm adhesions, and expedite the process of healing by granulation. As the mucous membrane of the stomach always shows a great tendency to evert, it should be fastened in the middle of the wound with a fine catgut suture before the wounds are approximated. A gastro-enterostomy, with the aid of approximation-plates, can be completed in from fifteen minutes to half an hour; while, if suturing is relied upon exclusively, the time required cannot fall much short of an hour and a half.

The following experiments of the author, taken from my work on "Intestinal Surgery," are well calculated to illustrate some of the advantages attending the use of absorbable

approximation-plates over the ordinary methods of suturing in gastro-enterostomy:

Experiment 1.—Dog, weight twenty-five pounds. Incision made through linea alba, from xiphoid cartilage to near umbilicus. Omentum pushed to one side, and the stomach drawn forward into the wound; near the middle of its anterior surface a longitudinal incision was made, two inches in length, and a gutta-percha plate, with a central oval opening the size of the pyloric orifice, was introduced. Four medium-sized juniper catgut sutures were attached through small perforations around the opening, one at each end and one on each side. The lateral sutures, armed with needles, were passed through the entire thickness of the walls of the stomach, half way between the angles of the wound. A similar incision was made into the intestine at the junction of the duodenum with the jejunum, the same kind of plate introduced, and the margins of the wound punctured by the lateral armed sutures, when the two wounds were brought *vis-à-vis* and the corresponding sutures tied. In tying the sutures, the lower lateral suture was tied first, and the threads cut short; next, the sutures corresponding to each angle of the wound were tied; and, lastly, the upper lateral. The serous surfaces of the stomach and intestine over an area corresponding to the size of the plates were brought into accurate permanent contact by the tying of the sutures. The stomach was replaced, and the abdominal wound closed. The animal was allowed to eat immediately after the operation, manifested no signs of illness or pain, and was killed seven days after operation. Abdominal wound healed. Omentum adherent to its inner surface. Union between stomach and bowel firm over the entire surface of approximation. Plates detached; the one in the bowel had passed, while the other was found loose in the stomach. The new opening was large enough to admit the index finger.

Experiment 2.—Dog, weight fifty pounds. The operation was performed in the same manner as in the previous experiment, but great difficulty was experienced in bringing the stomach forward, as this organ was distended to its utmost with an enormous quantity of solid food. Evacuation was effected through the incision, aided by attempts of the animal to vomit, the violent contractions of the stomach forcing the food toward the opening, from which it was removed with fingers and spoon. After the stomach was emptied, it was washed out with warm water. For the stomach a bone-plate, only partially decalcified, was used, while the approximation-plate in the bowel was fully decalcified. The four approximation sutures were of catgut. Several portions of omentum, which were soiled during the emptying of the stomach, were excised. The abdominal cavity was thoroughly irrigated with warm water before the wound was closed. The animal died the next day, and on opening

the abdomen it was ascertained that the immediate cause of death was haemorrhage, as the peritonaeal cavity was filled with blood. The bleeding undoubtedly took place from the omentum, by the slipping or loosening of one of the catgut ligatures.

Experiment 3.—Medium-sized dog. Operation performed in the same manner with decalcified bone-plates and catgut sutures. The first two days the animal had several attacks of vomiting; it subsequently showed no signs of suffering. Appetite good and stools regular. Killed thirty-four days after operation. Omentum adherent to inner surface of abdominal wound. At point of operation the stomach was contracted, so that the organ presented an hour-glass appearance. Interior of the organ contained a large mass of hay and fragments of bone. New opening large enough to pass index finger. Union between stomach and bowel over entire surface of approximation. Water passed into the stomach flowed through the pyloric orifice and the new opening in a stream of equal size.

Experiment 4.—Large bull-dog. Approximation of anterior surface of stomach with bowel by perforated gutta-percha plates and four catgut sutures. Length of visceral incisions, two inches. The day after operation the animal vomited his dinner; subsequently, no unfavourable symptoms. Killed fourteen days after operation. Abdominal wound well united. Omentum adherent to wound, duodenum, liver, and at the point of operation. Firm adhesion between stomach and bowel. Water admitted into the stomach only passed through the pyloric orifice. On opening the stomach, it was found that the wound in the stomach and intestine had completely healed, the site of incisions being marked by a narrow, firm cicatrix. The failure of obtaining an anastomotic opening between the stomach and intestine could only be attributed to one of two causes, viz., either the perforations in the plates were too narrow, or the needles of the lateral sutures included too much tissue. Either cause would bring about approximation of the margin of the wounds and permanent closure of the opening by granulation and cicatrisation.

Remarks.—All of the animals recovered, except in case of Experiment 2, without any untoward symptoms, although they were allowed to eat immediately after the operation, and the diet was not selected or restricted at any time. In the fatal case, death was caused from complications which had no connection with the gastro-intestinal opening. In all of the specimens examined, the mucous membrane of the stomach and intestine which had been interposed between the approximation-plates presented a healthy appearance, showing that the pressure of the plates had exercised no injurious effect on this structure. More recent experience with this operation on animals has revealed the fact that in the stomach a completely decalcified bone-plate is almost entirely digested in thirty-six to forty-eight hours. It would therefore appear advisable to

use only partially decalcified bone, which remains for a longer time, so that in case of delayed union the approximation would be maintained for a sufficient length of time. As the animals subjected to the operation recovered promptly, and under the most unfavourable conditions, we have every reason to believe that this operation will be attended by the same favourable results when done for pyloric or duodenal stenosis in man, where a careful preparatory and after treatment cannot fail to facilitate the operation and to improve the conditions for the formation of early adhesions and a speedy definitive healing of the wound. I have no hesitation in recommending it as a substitute for the more time-consuming and less certain operation by the tedious and difficult method of double suturing which is now generally practised.

Gastro-Enterostomy by the Aid of Absorbable Approximation-Plates.—Preparation for Operation.—The patient must be placed on a restricted diet for a number of days, and during this time the bowels should be evacuated freely by saline cathartics. If the stomach is much dilated, it should be evacuated and washed out daily with an aqueous saturated solution of salicylic acid, or Thiersch's solution. Irrigation of the stomach immediately before the anaesthetic is administered should never be neglected. The abdomen and anterior surface of the chest should be scrubbed with warm water and potash soap, shaved, and then washed with sulphuric ether, or equal parts of turpentine and alcohol, for the purpose of removing the fatty material and more effectually disinfecting the glandular appendages of the skin, and the umbilical depression. A compress saturated with a 1 to 2,000 solution of corrosive sublimate is now applied over the field of operation, which is then covered with an impermeable covering, such as gutta-percha tissue or oiled silk, and kept in place by a circular bandage, or a broad, snugly applied binder. If no contra-indication exists, chloroform is preferable to ether as an anaesthetic, as it is less liable to produce vomiting—an occurrence which should be guarded against as far as possible in this operation. If the patient is weak, two ounces of whiskey in a cupful of warm water should be administered per rectum just before the anaesthetic is administered.

Incision.—A straight median incision, extending from the ensiform cartilage to the umbilicus, will afford ample room

to bring well forward into the wound the pyloric end of the stomach and the loop of intestine which is to be united with the anterior surface of the stomach. The fastening of two or more catch-forceps to the parietal peritonaeum on each side of the wound will facilitate the remaining steps of the operation. Haemorrhage must be carefully arrested by applying a sufficient number of haemostatic forceps before the peritonaeal cavity is opened.

Decalcified Bone-Plates.—The material used for approximation-plates should be such as to resist the action of the gastric and intestinal juices, and secure efficient mechanical support for at least three or four days. Plates are much better than rings, because they coaptate and hold in accurate contact larger surfaces of the peritonaeum, and at the same time act as splints, securing for the parts interposed between them complete rest. After having used many kinds of material for this purpose, I settled on using decalcified bone exclusively. This substance will give the desired mechanical support for a sufficient length of time, when it is absorbed or disintegrated and disappears spontaneously, and there is no risk of a foreign body being left in the stomach as an irritant, and perhaps later on as a cause of intestinal obstruction.

The mishaps in the use of plates that have happened in my practice have been all in the use of dried plates. I consider the use of all hygroscopic material for the plates as dangerous, as the swelling of the plates may cause extensive pressure necrosis. The plates are now kept in a solution of equal parts of alcohol, glycerine, and water, between two pieces of glass, so as to preserve their smooth surfaces and prevent warping. The fixation sutures should be medium-sized silk, as cat-gut sutures are not sufficiently reliable: the knot is liable to become loosened, and to slip, and this material, when exposed to the action of the gastric and intestinal juices, does not resist their destructive action for a sufficient length of time. I must continue to insist that the sutures should be fastened to the plates by the single stitch, as if

anything should happen to the plate before adhesions have formed the sutures will still continue to hold the parts in apposition. The retention of the lateral or fixation sutures in the margins of the wound for weeks or even months is of no consequence, as I have seen the same repeatedly after circular resection of the intestine without any harm resulting from it. Eventually the threads will work their way through the tissues, and escape. The size of the plate, and especially of the oval central opening of the plate, should be sufficiently large to insure a permanent opening in the stomach at least as large as the lumen of the normal pylorus. The perforation in the centre should be at least an inch and three quarters in length, and about half as wide. The margin of the plate around the oval opening should be from one third to one half an inch in width. In using plates of this size and with such large openings, there is no danger of not obtaining a sufficiently large anastomotic opening, which, when once formed and lined with mucous membrane, will not undergo cicatricial contraction.

Approximation of Visceral Wounds.—It has already been stated that the most desirable point for making the opening in the small intestine is about thirty inches below the obstruction. How this part of the bowel can be found most speedily, safely, and with the greatest degree of certainty has already been described. As soon as the abdomen has been opened, the great omentum should be pushed aside and the intestinal loop selected brought out at the lower angle of the incision. The direction of the bowel must be ascertained, and then the loop brought into the position recommended by Rockwitz, and entrusted to a reliable assistant, who should have sole charge of it until it has been united with the stomach.

The intestinal loop is surrounded with a compress of aseptic gauze, when an incision long enough to introduce the bone-plate edgewise is made in the concave side directly opposite the attachment of the mesentery. After the bone-plate has been properly adjusted, the lateral or fixation

sutures are passed through the margins of the wound equidistant from the angles, and only enough tissue is included to hold the plates in place after the organs have been approximated by tying of the sutures. It is a good plan to direct the needles obliquely, from within outward, and to embrace all of the tissues with the exception of the peritonaeum. While the stomach is subjected to the same treatment, the intestinal loop is held as before. The opening in the bowel is covered with loose gauze, so as to absorb what little might escape from the interior of the intestine, which, under such circumstances, is usually nearly, if not completely, empty. As the stomach is usually more or less dilated, it can be found without any difficulty. The pyloric portion is brought forward into the wound, and is surrounded with a compress of gauze wrung out of warm sterilised water. The opening is made in the anterior wall, near the great curvature, parallel to the long axis of the organ, and at least two inches from the border of the carcinoma. As the mucous membrane always bulges outward and the wound sometimes bleeds freely, both of these conditions are corrected by a few stitches of the continued suture with fine cat-gut. No force should be used in inserting the bone-plate: the incision should be sufficiently long to permit its easy insertion. After the plate has been properly adjusted and fixed by the lateral sutures, and the serous surfaces which it is intended to bring into apposition by the plates have been scarified, the two wounds are brought directly opposite each other, and the approximation commenced by tying the posterior pair of lateral sutures; the threads are cut short to the knot. The sutures must be tied only with sufficient firmness to bring the parts into apposition without endangering the circulation. Next, the end sutures are tied, and lastly, the anterior pair of lateral sutures. Before these are tied, the margins of the wound in the stomach and bowel must be carefully pushed between the plate with a director or probe. The knots of the lateral sutures should be buried as deeply as possible, which can be done best with a probe or a pair of small, blunt-

pointed scissors. It is advisable to support the action of the plates by a few superficial stitches of fine silk. On the posterior side, these stitches should be inserted and tied before the plate sutures are tied. On the anterior surface, approximation of the serous surfaces along the margins of the plates can be accomplished most speedily by a few stitches of the continued suture of the same material. After cleansing and drying the parts which have been exposed during the operation, the stomach, and with it the attached intestine, are returned into the abdominal cavity, and the external wound is closed by a row of buried and superficial sutures. The external wound is either sealed with iodoform collodion, or the customary antiseptic hygroscopic compress is applied and held in place by strips of adhesive plaster.

After-treatment.—Stomach feeding must be postponed until quite firm adhesions have formed between the approximated parts, which will require at least two days. During this time the patient's strength is to be supported by rectal alimentation, and thirst is quenched with small fragments of ice or sips of hot water. Anodynes should not be given unless the patient is very restless, or suffers a great deal of pain. Should painful distention of the abdomen occur about the second or third day, a saline laxative should be administered, and if required, its action is assisted by a stimulating copious enema. After the first forty-eight hours, small quantities of liquid food at short intervals are allowed, and at the end of the first week the patient is placed on a carefully selected diet, which must be continued until the process of repair between the approximated serous surfaces is completed. Patients should not be allowed to leave the bed for at least four weeks, as otherwise a ventral hernia at the site of incision is very prone to appear as one of the remote consequences of the operation.

3. *Author's Cases of Gastro-Enterostomy for Malignant Disease of Pylorus.*

The following cases of gastro-enterostomy were made by myself during the last three years. In all of them the indi-

cation for the operation was an advanced carcinoma of the pylorus. All of the patients were greatly emaciated, and in two of them the general debility was so great that the operation was not advised, and was performed only at the urgent request of the patients and their friends. The perforated decalcified bone-plates were used in all operations in uniting the intestine with the stomach. At first dry plates were used, but after having met with two accidents, caused undoubtedly by the hygroscopic nature of the material, these were abandoned, and since using moist plates kept in an antiseptic solution no case of pressure necrosis has occurred.

I have made it a rule that the patient should abstain from taking food by the stomach for at least twenty-four hours prior to the operation, and rely during this time and a few days after the operation entirely upon rectal alimentation. The following description of the operation answers for all the cases.

The evening before the operation the stomach was washed out by the syphon-tube, and again just before the anaesthetic was administered. For the last irrigation a five per cent. solution of salicylate of soda, or Thiersch's solution, was used. In all of these cases the incision was made through the median line, and extended from near the ensiform cartilage to the umbilicus. The opening in the stomach was made parallel to the long axis of the organ, and at least an inch and a half distant from the margin of the tumor. A continued suture of fine silk or cat-gut was applied around the whole circumference of the opening, both for the purpose of arresting haemorrhage and preventing bulging of the mucous membrane. The opening in the intestine was made first, and the plate introduced and sutures adjusted, and the loop retained in the lower angle of the wound, covered by a warm compress. The large curvature of the stomach near the pyloric orifice was then drawn sufficiently forward into the wound to make the incision and introduce the plate. When everything was ready for adjustment, the parts around each visceral wound were carefully disinfected, dried, and the serous

surface lightly scarified with an ordinary needle over a surface corresponding to the size of the plate; the visceral wounds were then brought opposite each other, and a number of fine silk sutures, embracing only the serous and muscular coats, were applied behind the posterior margins of the plates and tied; the middle lower suture was now tied, while an assistant approximated the two openings; the end sutures were next tied, and lastly the anterior middle. The sutures were all cut short, and the ends buried. During the tying of the sutures it is necessary to exercise caution that the margins of the visceral wounds are well embraced by the plates all around. As in these cases the weight of the intestine exerts considerable tension, I have taken the precaution to apply a superficial continuous suture anteriorly after tying the four sutures so as to approximate the serous surfaces over the anterior margins of the plates. The necessary preparations being made, with good assistance the operation can be finished in from twenty to thirty minutes. Usually on the third day small quantities of peptonised milk and beef tea were given at short intervals, and solid diet during the second week.

Case I.—Male, aged sixty-five. Symptoms of pyloric stenosis for one year. Emaciated to a skeleton; oedema of legs; unable to retain food of any kind for more than a few hours. The patient was so anaemic and prostrated that he was only partially anaesthetised. During the operation, the pulse became almost imperceptible, and brandy had to be administered subcutaneously with lowering of head, and hot applications externally. An hour after the operation the pulse was stronger than before it was commenced. Rectal feeding; only slight rise in temperature on second day; no pain. On the third day, small quantities of liquid food by the stomach. The heart's action gradually failed, and the patient died of marasmus five days after the operation. The post-mortem revealed that the plates were still *in situ*, adhesions firm, and opening patent. No peritonitis. In this case the carcinoma was circular, and limited to the pylorus. Anastomosis just below the duodenum. The intense suffering had made the patient desperate, and although the nature of the disease and the probable outcome of the operation had been fully explained to him, he begged to have it done, with a perfect understanding that at best it would afford only temporary relief. I am quite confident that the operation did not shorten his life.

Case II.—Male, aged forty-seven. Duration of disease, eighteen months; obstinate vomiting; great emaciation, and oedema of legs. Contour of tumor could be readily mapped out by percussion and palpation. Tumor adherent to under surface of liver; enlargement of lymphatic glands. In this case the anastomosis was again made just below the duodenum. No untoward symptoms after operation. At the end of the first week solid food was allowed. No vomiting. At the end of the third week an abscess formed in the upper part of the healed incision, in the contents of which the plate ligatures were found. A gastric fistula formed, through which food escaped almost immediately after it was swallowed. This closed in less than two weeks, after which the patient improved in strength and gained in weight. He retained and digested all kinds of food. Improvement continued, so that he was able to walk short distances and to take long drives. At the end of three months after the operation he commenced to fail, and died two weeks later of progressive marasmus. Unfortunately, no post-mortem could be obtained.

Case III.—Male, aged thirty-five. Symptoms of pyloric stenosis for six months. Tumor discovered four months ago, rapidly increasing in size. Considerable emaciation and cachectic appearance. Tumor involves nearly one third of anterior wall of stomach, and the entire pylorus. Glands of omentum infiltrated. The first loop of intestine which came within reach was united with the anterior wall of stomach in the usual manner. Sutures of abdominal wound removed on the eighth day. Until this time, no untoward symptoms, although the patient had taken liquid food for several days. The day following, obstinate vomiting occurred; the plates, very much softened and greatly reduced in size, were ejected. The stomach was repeatedly irrigated, but vomiting continued until the patient died, three weeks after the operation. Post-mortem: Abdominal incision united throughout; omentum, stomach, and intestines adherent to abdominal incision. Anastomosis perfect at a point eight feet below pylorus. Intestine between pylorus and artificial opening enormously distended. As the opening was large enough to admit two fingers, it was difficult to understand what had caused the obstruction. The pyloric orifice was large enough to admit the tip of index-finger. Fluid could not be forced from the stomach into the bowel below the new opening. Injection through the duodenum was made, with the same negative result. On close examination, it was found that the intestine at the point of anastomosis, probably on account of the great length of the part between the stomach and the new opening, had become flexed at the point where it was attached to the stomach, and the two limbs were adherent to each other for four inches. This bending of the bowel had formed a spur, opposite to the opening in the stomach, by the apex of the concave side of the bowel;

and this spur acted like a valve, closing the opening in the distal part of the bowel when water was injected into the stomach or duodenum.

This case taught me that it is unsafe to follow the advice given by Luecke and others, to seize the first presenting loop for the anastomosis; as, by so doing, it is possible to grasp a loop of intestine which corresponds to the lower portion of the small intestines, as in this case. If this is done, we not only exclude permanently too great a portion of the intestinal canal from the processes of digestion and absorption, but a similarly unfortunate mechanical difficulty at the new opening may be created, as has been described above.

Lauenstein recently reported a case of gastro-enterostomy, where the post-mortem revealed that the new opening was made near the ileo-caecal region. In making a gastro-enterostomy, it is important, for the reasons just cited, to follow the advice of Hahn and search for the duodenum, which, when found, can be readily recognised by its short and fixed attachments, and to make the new opening in the upper part of the jejunum, as near as possible to the duodenum.

Case IV.—Male, aged forty-three. Has complained of stomach difficulties for a year. During the last two months, obstinate vomiting an hour or two after meals. Tumor as large as a child's fist; movable. Emaciation and marked anaemia; glandular infection behind the stomach. Anastomosis made just below the duodenum. Very little pain, and no other symptoms until the tenth day, when he vomited several times. Stomach washed out twice, four hours apart, and food by the stomach discontinued. No vomiting after this, and after two days a liquid diet ordered. At the end of the second week, could digest all kinds of solid food, which caused no distress. On the thirteenth day, fragments of both plates were found in one of the stools. Patient has gained in flesh, and after four weeks presented a great deal better appearance than before the operation. Patient survived the operation four months, and finally died of marasmus.

Case V.—M. S——, German, labourer, aged thirty-eight, was admitted into Milwaukee hospital, December 3, 1888. Carcinoma not hereditary in the family. In June last, patient first experienced a distressed feeling in the stomach a few hours after meals, attended by occasional attacks of vomiting, which occurred at intervals of several days, and always afforded temporary relief. As the disease progressed, the quantity of fluid ejected from the stomach became larger, and always contained fragments of food eaten several days before. The attacks of vomiting became more frequent, and gastric digestion more impaired. About two months ago, progressive emaciation set in;—the patient has lost thirty-five pounds in weight since the beginning of his illness. The pain has been intermittent in character, and occasionally quite severe. At the time of admission the patient was greatly emaciated, the skin dry, and of

a dark, almost bronze, colour. A well defined tumor is readily detected a little below the normal location of the pylorus. This tumor is quite movable, and ascends and descends synchronously with the respiratory movements. Irrigation and insufflation indicate that the stomach is greatly disturbed. A large quantity of partially digested food is removed through the stomach-tube. As the patient's condition was becoming more insufferable from day to day, and the treatment pursued had afforded no relief, he was exceedingly anxious to avail himself of whatever benefit might follow an operation. As the patient's strength had been failing very rapidly for the last two weeks, and as marked anaemia was present, I was fearful that the disease had resulted in almost complete obstruction of the pylorus, and had probably extended to one or more of the surrounding organs. Gastro-enterostomy was performed December 16. Immediately before the operation a subcutaneous injection of one sixtieth of a grain of atropine was made, and he was given at the same time two ounces of whiskey in warm water per rectum. On opening the abdomen, the dilated stomach presented itself at once in the wound. By pushing the organ toward the left side, the pyloric portion was made accessible to inspection and palpation. A carcinoma, extending from the pylorus to near the middle of the anterior wall of the stomach, was readily mapped out. The disease was much more extensive than I had reason to believe from external examination before the abdomen was opened. Manual exploration revealed what I had suspected—extension of the carcinoma from the posterior surface of the stomach to the head of the pancreas, numerous carcinomatous lymphatic glands behind the stomach and in the great omentum. As the anterior wall of the stomach was so extensively infiltrated, it became necessary to make the incision for the communicating opening with the small intestine nearer the cardiac, than the pyloric, orifice. The part of the intestine selected was the junction of the duodenum with the jejunum. Duration of operation, about thirty minutes.

The patient recovered satisfactorily from the immediate effects of the operation; and, although he vomited twice during the evening, the pulse and temperature were noted as normal the following day. On the second day, a slight tympanites developed; at the same time, the patient complained of pain at the site of operation. Rectal injections were relied upon exclusively in stimulating and supporting the patient. Although the temperature remained normal until the morning of the fifth day after the operation, tympanites and pain remained as conspicuous symptoms, and the pulse became more rapid and feeble. The bronzed colour of the skin, so marked before the operation, assumed a deeper hue from day to day. On the morning of the fifth day the thermometer registered 97° F. under the tongue, but toward evening the temperature increased to 101° F. The next morning, the temperature reached

104° F.; and at noon the patient expired. The post-mortem revealed a minute perforation at the upper border of the approximation-plates. Dry plates were used in this case, and these had become much softened and thickened, and remained *in situ*. Adhesions between stomach and intestine quite firm. Peritonitis limited to the upper portion of the abdomen. Nearly half of the stomach on the pyloric side involved by the carcinoma. Pyloric obstruction almost complete. Pancreas extensively infiltrated. As only a few auxiliary superficial sutures were used in this case, it appears probable to me that during the violent attacks of vomiting, soon after the operation, a limited separation of the approximated viscera occurred; and that the peritonitis, which was the immediate cause of death, was due to this cause.

Case VI.—A farmer, aged sixty-nine, came under my observation at the Milwaukee hospital, March 28, 1889. No hereditary predisposition to carcinoma or tuberculosis in his family. He was an industrious man, and in possession of good health until March, 1882, when he had an attack of dyspnoea, which he attributed to fatty degeneration of the heart. A similar attack occurred during the following month, which this time was believed to have been caused by dyspepsia. From this time on he experienced, at different times, weight, and a sensation of fulness in the stomach an hour or two after meals. In January, 1889, he first discovered a tumor in the region of the stomach; at the same time digestion became more impaired, so that he could eat and retain only the lightest articles of food. His general health failed rapidly, and before he entered the hospital his body weight was reduced from one hundred and fifty to one hundred and fifteen pounds. For the last ten days stomach feeding had to be suspended almost completely, on account of the pain and distress that followed the eating of small quantities of the blandest kinds of food. Patient is very anaemic, ankles oedematous, pulse 80 to 90 per minute, and very soft and compressible. Tumor in pyloric region about the size of a small orange; movable. After inflation the outline of the large curvature of the stomach could be seen and felt two inches below the umbilicus, while the tumor did not change its relative position to the anterior abdominal wall. Although the patient and friends were fully informed in reference to the probable outcome of an operation, in view of the enfeebled condition of the patient, gastro-enterostomy was performed at their urgent request March 31, 1889. Elaborate preparations were made for the operation, for the purpose of preventing collapse. Atropia and whiskey were administered, as in the preceding case. The abdomen was opened, as usual, in the median line, and by retracting the margin of the wound on the right side, the carcinomatous pylorus was brought at once into the wound. The disease had passed beyond the serous coat, and at some points fungous masses could be seen and felt on the surface of the tumor. Adhesions had formed

between the growth and the under surface of the liver, and the head of the pancreas appeared to be incorporated in the cancerous mass. The disease involved about four inches of the pyloric end of the stomach. Numerous carcinomatous glands in the great omentum and behind the stomach. An anastomatic opening was established between the stomach, about two inches from the border of the tumor and near the great curvature, and the small intestine about three feet below the pylorus, by the aid of a large pair of soft plates of decalcified bone. The serous surfaces between the plates were freely scarified, and the action of the plates enforced by superficial interrupted sutures posteriorly, and the continued suture along the anterior border of the plates. Although the operation did not require more than thirty minutes, toward its close the patient's condition became critical—pulse almost imperceptible, profuse clammy perspiration, and pupils widely dilated. Under the influence of stimulants administered subcutaneously and per rectum, and the external application of heat, the pulse improved temporarily; but collapse again appeared, and the patient died two hours after completion of the operation.

Case VII.—German labourer, aged thirty-two, was admitted into Milwaukee hospital April 8, 1889. His digestion had always been good until nine months ago, when he first experienced pain in the region of the stomach, especially an hour or two after a hearty meal. Three months later a swelling was detected to the left of the median line and a little above the level of the umbilicus. At this time vomiting commenced at intervals of a few days, and the patient states that the ejected material sometimes had the appearance of coffee-grounds. During the last three months emaciation had been alarmingly rapid. At the time of admission a tumor was found about the junction of the left hypochondriac with the epigastric regions, and two inches above the umbilicus. The tumor could be moved from side to side, and ascended and descended synchronously with the respiratory movements. Althongh the tumor apparently involved the cardiac portion of the stomach, the clinical symptoms pointed to obstructive disease of the pylorus. Its anatomical location was definitely demonstrated by insufflation. During the inflation the tumor changed its position, and when the stomach was well distended it could be distinctly felt and mapped out by percussion at a point a little below the normal situation of the pylorus, while the large curvature of the stomach could be plainly outlined about three inches below the level of the umbilicus. It was evident that the organ had assumed a nearly vertical position, owing to the long-standing pyloric obstruction and the great dilatation resulting from it. During the preliminary treatment it became evident that the carcinoma had ulcerated, as on several occasions traces of blood were found in the fluid which returned from the stomach. Gastro-enterostomy was performed

by the aid of soft decalcified bone-plates, April 10, 1889. The tumor was found to occupy the pyloric region, and had encroached upon the stomach to the extent of several inches. Although the tumor was very large—the size of an adult's fist—it was freely movable, and not adherent to any of the surrounding organs; but the lymphatic glands behind it, and in the great omentum, were extensively infiltrated. On account of the extent of the disease, the anasomotic opening in the stomach had to be made nearer the cardiac, than the pyloric, end. The part of intestine selected was the jejunum, about twelve inches below its junction with the duodenum. Superficial sutures all around the borders of the plates. No untoward symptoms after the operation. Stomach feeding was resumed the fourth day after the operation. The intestinal plate, partially disintegrated but perfect in outline, was passed per rectum on the tenth day. At the end of the first week the patient developed a sharp appetite, ate and digested well a liberal diet, and gained rapidly in strength, and his appearance had undergone a remarkable change. Action of the bowels normal. External wound healed by primary union throughout. In the evening of the fourteenth day after the operation he complained of nausea and a sense of fulness in the stomach, and became suddenly extremely anaemic, and died within a few hours. Although no post-mortem was allowed, the symptoms which preceded the sudden fatal termination left but little doubt that death was caused by profuse haemorrhage into the stomach from the ulcerating carcinoma. This view of the case is supported by the fact that soon after the patient complained of nausea, percussion revealed an extensive area of absolute dulness over the region of the stomach.

Case VIII.—Brewer's wife, forty-five years old, German, with no history of malignant disease in her family, and previously in good health, had been the subject of serious disturbances of gastric digestion for about a year. During this time she has lost more than fifty pounds in weight. Vomiting appeared about three months ago, at intervals of several days, and always copious. No blood in the material ejected. I made an examination, February 22, 1890, and advised a gastro-enterostomy, as the symptoms then clearly indicated almost complete closure of the pyloric orifice of the stomach. A well defined tumor was found near the median line, a little above the umbilicus. The tumor could be displaced readily to either side, but always returned spontaneously to its former location. Irrigation showed that the stomach was greatly dilated and insufflation demonstrated that the tumor occupied the pyloric extremity. The presence of ulceration was determined by microscopic examination of the contents of the stomach, which revealed numerous blood corpuscles unchanged by the gastric secretion.

The patient's general health was such at this time that hope could be entertained that she would survive the immediate effects of the opera-

tion, and that life might be prolonged by establishing a new outlet from the stomach into the intestine. The operation was declined. The patient returned four weeks later, anxious to submit to any treatment that might offer a chance to check the rapid progress of the disease. Her general condition had undergone a great change for the worse during this time. Gastric digestion had become nearly suspended, to which were added great loss of strength and progressive marasmus. The tumor had materially increased in size, but remained movable; the stomach had become more dilated, vomiting occurred at longer intervals, and the quantity ejected was correspondingly larger. As the patient's only hope was grounded on the expectation of having an operation performed, I yielded unwillingly to her urgent request, and performed gastro-enterostomy March 22, 1890. Stomach was washed out after the patient was under the influence of the anaesthetic, as she absolutely refused to have it done before. The tumor presented itself at the middle of the median incision as soon as the abdomen was opened. The serous surface was perforated at different points by the carcinoma, and the affected part of the stomach was found adherent to different organs by neoplastic adhesions. On the posterior surface the tumor was firmly connected with the pancreas. A large portion of the latter organ appeared to be involved by the disease, a circumstance which rendered it very difficult to bring the stomach sufficiently forward into the wound for direct operative treatment. As the disease had extended along the great curvature of the stomach farther than along the upper border, the incision was made nearer the small curvature than usual, in order to make the opening at a safe distance from the carcinoma. The intestine was opened near the junction of the jejunum with the duodenum, and the two visceral wounds were approximated in the usual manner by two large decalcified bone-plates and a row of superficial sutures. The intestine was united with the stomach in the position advocated by Rockwitz. The plates used in this case were dry, and had been kept in this condition for some time.

Stimulants and food were administered exclusively by rectal enemata.

The operation was not followed by any symptoms of shock, but the patient made repeated attempts at vomiting before she fully recovered from the effects of the anaesthetic. March 24, forty hours after the operating, both plates, held together by the four sutures, were ejected during a violent attack of vomiting. Both plates were softened, and at least twice as thick as when they were inserted in the dried state. Although the serous surfaces interposed between the plates were freely scarified before the viscera were approximated, and a row of superficial sutures was placed all around the borders of the plates, I was fearful that the adhesions between the stomach and intestine had given way during the violent fit of vomiting which brought up the plates, and that

the patient would soon succumb to perforative peritonitis. I was astonished the next day to find the general condition of the patient much improved. She was now allowed liquid food by the stomach, which she retained and digested without any difficulty, and her strength began to improve materially; when, on March 26, two days after the occurrence of this accident, she was suddenly attacked with typical croupous pneumonia of the lower lobe of the left lung, which proved fatal April 3, seven days after the initial chill. The external incision healed by primary union, the bowels responded promptly to mild cathartics, and after the ejection of the plates the symptoms of obstruction were entirely relieved. It is well to mention the fact that at the time the operation was made "la grippe" was epidemic in the city, and a number of the patients in the hospital were affected by it.

I am convinced that the increased thickness of the plates, owing to the absorption of fluids from the stomach and intestine, caused pressure gangrene of all the tissues interposed between them, and that perforative peritonitis was only prevented by the superficial sutures which secured adhesions between the stomach and intestine around the area of gangrene. This case taught me an important lesson, and since then I have abandoned the use of hygroscopic material for the plates.

Case IX.—Male, aged seventy-one, with a good family history, consulted his family physician August 11, 1889. At this time he was well nourished, body weight 160 pounds; complection florid; pulse, respiration, and temperature normal. Appetite good, but complains of severe pain in the epigastrium and sensation of weakness in the back. After meals, has a feeling of fulness in the stomach, and eructations of gas. In the absence of positive physical signs, his affection was regarded as a chronic gastric catarrh due to pyloric stenosis from unknown cause.

January 15, 1890, the patient was again examined. He has had for some time persistent vomiting three or four hours after meals. If vomiting did not occur for several days, enormous quantities of a brownish, sour fluid, containing undigested fragments of food, were ejected by repeated efforts. Vomiting preceded and accompanied by sensation of heat and burning in the pharynx. Sleeps well, when not disturbed by vomiting. He had lost a great deal in weight; skin pale, dry, and scaly; tongue dry, and heavily coated in the middle, edges red and moist. The copious panniculus adiposus had almost completely disappeared. A tumor, the size of a child's fist, could now be readily detected to the right of the median line and a little below the normal situation of the pylorus. The tumor was movable, and could be displaced to the left of the median line. Irrigation of the stomach revealed enormous dilatation, and insufflation demonstrated that the tumor involved the pyloric extremity. The family were informed of the true nature of the

affection, but the patient was told that he had an obstruction at the pyloric orifice which would require an operation in order to obtain the desired relief. The patient was subjected to proper preparatory treatment, after which gastro-enterostomy was performed at the Milwaukee hospital, January 31, 1890. The disease was found to involve about three inches of the pyloric end of the stomach, and the omental and retro-peritonaeal glands were extensively infiltrated. Moist, large, decalcified bone-plates were used. The incision in the stomach was made near the great curvature and about two inches from the margin of the tumor. The upper portion of the small intestine was placed in Rockwitz's position, and after incision was joined to the stomach in the usual manner by approximation-plates and superficial sutures. Although the patient was very anaemic and greatly emaciated, the operation produced no shock or any other untoward symptoms. Stomach feeding was commenced on the third day, and after the expiration of a week a liberal diet of solid food was allowed. The external incision healed by primary union, and the sutures were removed on the ninth day. The symptoms of obstruction disappeared promptly after the operation, and digestion was fairly well performed. The patient left the hospital February 13, in excellent condition, fully confident that the operation had secured for him permanent relief, and that it would add many years to his life. A month later he reported that he had gained eight pounds in weight, and that he could eat all kinds of food without causing pain or discomfort after eating. He conducted his business for eight or nine months, made many distant journeys, and enjoyed life as well as the average man in perfect health. A ventral hernia developed at the site of the external incision, but did not cause much inconvenience. The patient lived for twenty months after the operation, and finally died of marasmus. During the last few weeks digestion was impaired, and symptoms of obstruction again appeared, but were not as distressing as before the operation. There can be but little doubt that at this time the carcinoma reached the new pylorus, and partially occluded its lumen. It was evident to all who witnessed the operation, that, judging from the general condition of the patient and the extent of the disease, life could not be prolonged for more than a few weeks without surgical intervention.

Case X.—Farmer, aged thirty-seven, was admitted into the Milwaukee hospital, December 27, 1890. During the last six years he has suffered repeatedly from attacks of indigestion. For the last two months he has had a severe pain in the stomach, which was always aggravated after meals, and was only partially relieved by vomiting. Vomiting has occurred during the same time regularly whenever solid food had been taken. As the vomiting came on several hours after eating, pyloric obstruction was suspected some time ago, but, considering the

age of the patient, it was believed that it was of a non-malignant nature. The patient lost twenty pounds in weight in a few weeks. Examination revealed a hard, irregular tumor to the right of the median line, and half way between the crest of the ilium and the costal arch. The tumor was not affected by the respiratory movements, and, on palpation, appeared to be firmly fixed by adhesions to surrounding organs; neither was its location changed by inflation. During inflation, a tympanitic area could be mapped out on the left side of the tumor, extending far below the level of the umbilicus. Inspection and palpation through the median incision revealed a diffuse carcinoma of the pylorus, which had encroached upon the anterior wall of the stomach to the extent of at least four inches, and had extended to the under surface of the liver and the pancreas. Posteriorly, the tumor had evidently reached the retro-peritonaeal tissue, as it formed one common mass with the enlarged retro-peritonaeal lymphatic glands and pancreas. In the omentum numerous glands, varying in size from a split pea to an almond, were found. Considering the time since symptoms of obstruction first appeared, it was evident in this case the tumor developed very rapidly, and gave rise to early glandular infection, and extension to surrounding organs and tissues by contiguity. Through the incision in the stomach digital exploration showed a soft, cancerous mass, occluding almost completely the pyloric orifice. Gastro-enterostomy was made by the aid of large, moist bone-plates, with the intestine in Rockwitz's position. Although unnecessary handling of the abdominal organs was carefully avoided, and the operation was completed in less than half an hour, profound shock set in, which, in spite of active stimulation, proved fatal five hours after operation. At the post-mortem, the abdominal incision was found agglutinated, omentum adherent to the wound. Although the stomach was washed out thoroughly just before the anaesthetic was administered, and was found empty when incised, it contained a large quantity of a viscid fluid which was retained probably on account of complete suspension of muscular contraction after the operation, as the anastomotic opening was patent, and fluid could be forced through it in a large stream. Only a very small stream could be forced through the pylorus, showing that its lumen was almost completely obliterated by the ulcerating carcinoma. Approximation of serous surfaces was so perfect, that under considerable pressure no leakage could be produced. Nearly half of the pyloric portion of the stomach was infiltrated. The extension of the disease to surrrounding organs, ascertained during the operation, was verified by the post-mortem. The result of my observations has been, that when young persons are the subject of carcimona of the stomach, the disease pursues a more rapid course, and results early in extension to other organs, and diffuse infiltration of the retro-peritonaeal and omental lymphatic glands.

Case XI.—German, farmer, aged forty-five, was admitted into Milwaukee hospital January 21, 1891. Maternal uncle died of carcinoma of the stomach at the age of fifty; patient has always been in robust health until six months ago, when, at intervals of several days, he began to vomit about midnight. A month later a burning pain appeared in epigastrium, radiating toward the right side, which was always relieved by vomiting. The vomiting became more frequent, and the amount of fluid ejected more copious, in the course of time. During the last few weeks the simplest articles of food have remained undigested in the stomach, and could be identified in the large quantities of dark, viscid fluid thrown up daily by vomiting. Within a few weeks the patient has lost thirty-five pounds in weight. Lavage of the stomach always afforded temporary relief. Patient presents an anaemic and marked cachectic appearance. No tumor can be felt in the pyloric region, either before, during, or after insufflation. Insufflation, however, reveals enormous dilatation of the stomach. The history of the case, and the leading symptoms, clearly indicated the existence of pyloric stenosis. The general condition, and the rapidly increasing stenosis, left but little doubt as to the malignant nature of the obstruction. The patient was exceedingly anxious to avail himself, at this stage, of the doubtful benefits that might be derived by surgical intervention; and, at his urgent request, gastro-enterostomy was performed the day after he entered the hospital. Large moist plates were used, and the intestine, at a point about thirty inches below the pylorus was attached to the stomach in Rockwitz's position. No circumscribed tumor was found, but several inches of the pyloric end of the stomach were diffusely infiltrated, the walls much thickened. Diffuse infiltration had also taken place towards the duodenum; even the unaffected portion of the stomach, which was considerably dilated, presented an oedematous appearance, numerous lymphatic glands behind the tumor, and in the great omentum, varying in size from a hemp seed to a large pea. At the close of the operation, which was finished in less than half an hour, symptoms of shock appeared. The patient rallied under the judicious use of stimulants and the external application of dry heat. No untoward symptoms after the patient rallied from the immediate effects of the operation. No vomiting. Bowels moved freely on the second day. On the fourth day stomach feeding was resumed, and the food administered caused no distress. Sutures were removed on the ninth day, at which time the incision was found healed. The patient appeared to improve for a week, when, in spite of a liberal allowance of easily digestible food which was retained and digested, his strength gradually failed, and he died of simple exhaustion, February 9, eighteen days after the operation. It is apparent that in this case the operation proved a surgical success, but that it was performed too late to add much to the duration of the patient's life.

Case XII.—Labourer, thirty-five years of age, suffering from advanced carcinoma of the pylorus, came to the Milwaukee hospital, March 28, 1891, for the purpose of subjecting himself to surgical treatment for pyloric carcinoma. He had always been in good health until about nine months ago, when he began to have a feeling of heaviness and oppression in the stomach a few hours after meals, followed by increasing pain, especially toward evening, which was only partially relieved by vomiting. Vomiting occurred regularly every second or third day. The gastric distress and vomiting gradually increased in intensity and frequency, and he commenced to lose flesh rapidly. At the present time he is unable to retain and digest any solid food, and in consequence of long continued defective nutrition presents an exceedingly marantic appearance. A round, smooth, movable tumor in the pyloric region was easily detected, and recognised as a carcinoma of the pylorus. The short duration of the disease, and the great mobility of the tumor, made me hopeful that I should be able to make a pylorectomy, and the necessary preparations were made for this operation.

Operation, March 30, 1891. On opening the abdomen the tumor was found free, and limited to organ first affected. Examination of the space behind the tumor revealed numerous enlarged lymphatic glands, a condition which induced me to abandon the intention of removing the carcinomatous pylorus, and to substitute for this operation a gastro-enterostomy. The operation was completed in twenty-five minutes. The upper portion of the small intestines was placed in Rockwitz's position before the anastomosis was made. The patient recovered from the operation without a single untoward symptom, and after the fourth day, when stomach feeding was commenced, gastric digestion was performed in a satisfactory manner. The external incision healed by primary intention, and the sutures were removed on the ninth day. The patient left the hospital at the end of the second week; and from subsequent information received, I learned that he lived three months in comparative comfort, and finally died of marasmus. The anastomotic opening in this case remained patent, and served as an efficient outlet for the chyme, as little or no food could pass through the obstructed carcinomatous pylorus.

Case XIII.—Male, aged forty-four, German, carpenter by occupation; was sent to the surgical clinic of Rush Medical College for diagnosis and opinion concerning a chronic affection of the stomach, six weeks prior to the operation. He stated that for a number of years he had been the subject of frequent attacks of indigestion, and that he had been unable to eat heavy articles of food without bringing on one of these attacks. During the last year the gastric disturbances have come on at shorter intervals and with greater intensity. Three months ago he first commenced vomiting daily a few hours after the principal meal, and this

symptom has recurred at regular intervals ever since. During this time he has lost a great deal of flesh and strength, and even at the time of the first examination he presented a decidedly cachectic appearance. In the region normally occupied by the pylorus, but a little lower down, a hard nodular tumor can be distinctly felt. Irrigation and insufflation of the stomach prove that the organ is greatly distended. During the insufflation, the large curvature of the stomach can be outlined distinctly about four inches below the umbilicus; at the same time the tumor is forced a little to the right without changing its relative position to the anterior abdominal wall. The diagnosis made at that time was carcinoma of the pylorus, causing obstruction and dilatation of the stomach. As at this time gastric digestion was nearly suspended, and the patient had already become greatly debilitated from this cause, a gastro-enterostomy was advised.

Nothing was seen or heard from the patient until five weeks later, when he again made his appearance in the clinic, and begged to have the operation performed. In the meantime he had become emaciated to a skeleton. Eyes were sunken in their sockets, cornea lustreless, skin wrinkled and of a dark bronze hue, and ankles oedematous. The tumor had increased in size, and the dilatation of the stomach had reached such an extent that the organ was unable to expel its contents by vomiting. The large curvature nearly reached the pubes. A large quantity of a dark viscid fluid was evacuated from the stomach through an elastic siphon-tube, which afforded temporary relief. The rapid extension of the local disease, and the general critical condition of the patient, induced me to advise against an operation, as I was almost convinced that the patient could not survive the immediate effects of the anaesthetic and the shock produced by an operation even of very short duration. The patient would not listen to my objections, and insisted that the operation should be performed regardless of consequences. I finally yielded to his earnest pleadings, and operated on him before the class, August 21, 1891. For two days prior to the operation the stomach was washed out twice daily, and during this time the patient's strength was supported by rectal alimentation consisting of injections of peptonised milk, beef tea, and eggs prepared with sodic chloride. A subcutaneous injection of one sixtieth of a grain of atropia and a rectal enema of two ounces of whiskey in a teacupful of warm water were given in order to guard against shock during and after the operation. Owing to the feebleness of the heart's action, ether was used as an anaesthetic in preference to chloroform. The carcinoma extended from the pylorus to the junction of the outer with the middle third of the stomach. The tumor was firmly attached by neoplastic adhesions to the surrounding organs. Omental and retro-peritonaeal glands extensively infiltrated. The incision in the stomach was made near the centre of the organ, and with it

was united a similar incision of the small intestine, near the junction of the jejunum with the duodenum, the intestine being placed in Rockwitz's position before the approximation with large decalcified bone-plates was made. Scarification of the serous surfaces, and suturing along the outer border of the plates, were done in the same manner as in the preceding cases. The operation occupied less than half an hour, yet near its completion the pulse became very rapid and feeble, the extremities cold, and the pupils widely dilated. In spite of active stimulation by subcutaneous and rectal injections, and the external application of dry heat, the patient did not react from the immediate effects of the operation, and died eight hours later.

TABLE OF THIRTEEN GASTRO-ENTEROSTOMIES FOR MALIGNANT PYLORIC OBSTRUCTIONS.

Case.	Sex.	Age.	Duration of Disease.	Result.	Remarks.
1	Male.	67	1 year.	Recovered.	Died five days after operation, of exhaustion.
2	"	47	18 months.	"	Improved for several weeks; died of marasmus three months after operation.
3	"	35	6 "	Died.	Immediate cause of death intestinal obstruction at site of operation; death three weeks after operation.
4	"	43	1 year.	Recovered.	Improved for several weeks; died of marasmus four months after operation.
5	"	38	6 months.	Died.	Immediate cause of death, perforative peritonitis.
6	"	69	1 year.	"	Cause of death, shock, two hours after operation.
7	"	32	9 months.	Recovered.	Death from haemorrhage into the stomach, from ulcerating carcinoma, nine days after operation.
8	Female.	45	1 year.	"	Died twelve days after operation, from croupous pneumonia.
9	Male.	71	16 months.	"	Improved for several months, and died of marasmus twenty months after operation.
10	"	37	4 "	Died.	Cause of death, shock, five hours after operation.
11	"	45	6 "	Recovered.	Died eighteen days after operation; immediate cause of death, marasmus.
12	"	35	9 "	"	Improved for several weeks, and died of marasmus three months after operation.
13	"	44	1 year.	Died.	Died eight hours after operation; immediate cause of death, shock.

Remarks.—Adding the 2 pyloro-plastic operations to the 13 gastro-enterostomies, we have 15 operations on the stomach for malignant and non-malignant stenosis of the pylorus, of which number 10 recovered and 5 died, a mortality of 33.3 per cent. Of the 13 operations for carcinomatous pyloric obstruction on as many patients, 12 were males and 1 female. The youngest patient was thirty-two years of age, the oldest seventy-one; average age, forty-six years and ten months. The duration of the dis-

ease could only be ascertained approximately, eighteen months being the longest, and four months the shortest, period intervening between the first manifestation of symptoms and the time of operation; average duration, ten months and ten days. In most of the cases vague symptoms of gastric derangement preceded the actual development of symptoms pointing to pyloric obstruction for several years, months, or weeks. In all of the cases the existence of pyloric obstruction at the time of operation was evident from the complexus of symptoms present at the time, the results of physical examination, and, in most instances, verified by digital exploration of the pylorus during operation. In only one case did I fail in detecting enlarged lymphatic glands in the vicinity of the carcinoma, and that was the first case reported, in which I found an annular malignant stricture without involvement of the serous coat and adjacent lymphatic glands. This would have been a proper case for pylorectomy had the patient's condition warranted such an operation. In all of the remaining cases the carcinoma was more extensive, and the lymphatic glands in its vicinity infiltrated, and in many of the cases the growth was connected with one or more of the surrounding organs by neoplastic adhesions. In all of these cases the local conditions were of such a nature that a radical operation by pylorectomy was out of the question, irrespective of the general condition of the patients. Analysis of the immediate and remote results of the thirteen cases of gastro-enterostomy shows the following: Eight of the patients survived the immediate effects of the operation, and five died. Among the recoveries are included all cases in which the immediate cause of death could not be attributed to the operation. In Case I, death occurred five days after operation, from exhaustion. Nothing occurred that would tend to show that the operation shortened life. The patient was extremely anaemic and emaciated at the time of operation, but he rallied from its immediate effects promptly; the symptoms of obstruction were relieved, but he gradually sank, and died five days later from simple exhaustion, due to the disease and its secondary consequences and not to the operation. In two other cases reported as recoveries, death occurred in one, twelve days after operation, from croupous pneumonia; in the other, on the ninth day, from haemorrhage into the stomach from the ulcerating carcinoma. In both instances the external incision had healed, the symptoms of obstruction were removed, and gastric digestion was partially restored. The remaining five cases that recovered lived, respectively,—one, eighteen days; two, three months; one, four months; and one, twenty months after the operation, and finally died of marasmus. The most remarkable of these was Case IX, the oldest patient on the list, who had been suffering from pyloric carcinoma for sixteen months, and who, at the time of operation, certainly could not have lived for more than a few weeks without surgical intervention. This patient recovered without a single unto-

ward symptom, lost the cachectic appearance, gained a number of pounds in weight, resumed and conducted his business for eight months, and died of marasmus twenty months after operation. Billroth makes the statement that in none of his cases of gastro-enterostomy for malignant pyloric obstruction was life prolonged for more than a year after the operation. Two of my patients lived three, and one four, months after operation, and in none of them did symptoms of pyloric obstruction appear after the operation. In Case III, a post-mortem was made. The dilatation of the stomach had disappeared; the anastomotic opening was large enough to admit the tips of two fingers, and was lined throughout by mucous membrane. In the five fatal cases, death occurred in from two hours to three weeks after operation. In three of these the patients succumbed to the immediate effects of the operation in two, five, and eight hours. One died of perforative peritonitis on the fifth day, and in one, death was caused by intestinal obstruction three weeks after operation. In the last case the intestine was attached to the stomach at a point eight feet below the pylorus. At a point nearly in the centre of the opening in the bowel a sharp flexion was found at the post-mortem, and in consequence of this flexion the mesenteric portion of the bowel formed a spur, which directed the contents of the stomach into the portion of bowel on the proximal side of the anastomotic opening. In view of the extent of the local disease, the gravity of the secondary lesions, due to long standing pyloric obstruction, and the serious impairment of the general health present in all the cases, the immediate and remote results as given above must be regarded as satisfactory.

The important lesson to be drawn from these cases is, not to postpone operative treatment for pyloric obstruction until the patient's strength is so much reduced that death would be likely to ensue from the immediate effects of an operation of even very short duration. In a number of the cases reported above, an operation was advised in time, but was refused until the patient had become convinced by sad experience that it offered the only chance of relief; but in the meantime the local and general conditions had become so much aggravated that the prospects of success were reduced to a minimum. More than one of the patients, when he had this desperate condition, threatened to put an end to his sufferings by suicide in case an operation was refused; and this determination more than once turned the scales when I hesitated to carry into effect their request. Patients suffering

from pyloric stenosis must be informed in time of the inefficacy of all methods of treatment short of removal or rendering harmless of the obstruction by operative treatment. The results of gastro-enterostomy for malignant stenosis of the pylorus will improve and become more satisfactory as soon as the profession will sanction early surgical interference, and patients can be made to submit to it as soon as a positive diagnosis can be made.

In conclusion, I beg to submit the following propositions for your further consideration and discussion:

1. Pyloroplasty, as devised by Heineke-Mikulicz, is the safest and most efficient operation for cicatricial stenosis of the pylorus.

2. Pylorectomy in the treatment of carcinoma of the pylorus is a justifiable procedure when the disease is limited to the organ primarily affected and the patient's general condition furnishes no contra-indication.

3. Gastro-enterostomy, by the aid of large, moist, perforated plates of decalcified bone, should be resorted to in the treatment of malignant stenosis of the pylorus as soon as a positive diagnosis can be made, and a radical operation is contra-indicated by local or general conditions of the patient.

NOTES ON THE TREATMENT OF TUBERCULOSIS.

By Frederic M. Warner, M. D., of New York County.

October 29, 1891.

The popular idea that tuberculosis is inheritable is insisted upon by some observers,—more formerly, however, than now,—and controverted by others, who even doubt the possibility of the infection of the foetus by the bacilli in the blood of the mother.

The presence of the tubercle bacilli have been demonstrated in the seminal vesicles of the tubercular human male in the absence of disease of these organs; and they likewise have been found in the Fallopian tubes of a female, dying of pulmonary and intestinal tuberculosis. And there are cases on record where the disease has been discovered in the human foetus,—this latter, however, but rarely,—differing in this respect markedly from the occurrence in animals, as the evidence has been brought forward many times to prove that the cow frequently transmits tubercular disease direct to its embryo.

The weight of authority rests with the opinion of those observers who believe that very young infants suffering from tuberculosis have acquired the disease, not by inheritance, but by the ingestion of contaminated milk, by the inhalation of bacilli-laden air, or by inoculation. The opinion, moreover, is pretty general, that although the bacillus is seldom transmitted by inheritance, a suitable soil favourable for its lodgment and growth undoubtedly is. The fact that the lung is the primary seat of tubercular disease in alleged inherited cases, is against the theory that the bacilli are transmitted through the blood; in which case the probability is that the lung would not be more liable to the disease than

any other organ. Jacobi relates a case of a seven months child, born of a phthisical mother, which only lived a few months, and in which there were found numerous gray miliary tubercles in the tissues of the liver near the surface, a few in its peritonaeal covering and in the spleen, and on the pulmonary pleura. This probably was a case of hereditary transmission. Other writers have observed tuberculosis in infants from three to eight weeks old, at such advanced stages that the probabilities are that the disease commenced during foetal life. Undoubtedly tuberculosis may be transmitted by the inhalation of minute particles of dust laden with bacilli from dried sputa, and this probably is the most common method of infection. Therefore environment plays a prominent part in the preventive treatment of this disease; and one of the most important points for consideration in this connection is how great the danger may be of infection from a phthisical patient to surrounding friends and attendants. That the danger is actual and present, the following instance will show:

A patient of mine in good general health moved into a house which previously had been occupied by various members of her husband's family, who had one by one died of pulmonary tuberculosis. No precautions were taken. The furniture and carpets remained in use, and the same paper on the walls. Within a year the woman became infected, and died in the course of a few months, her husband and the other members of the family escaping.

Eve has described a case where tuberculosis was communicated by a rabbi during the rite of circumcision. (He died eight months afterward of phthisis.) The rabbi had ejected some wine from his mouth upon the wound. Six months later, enlarged glands appeared in the child's groins.

In considering the value of preventive treatment, the first point that I wish to make is, that it is absolutely necessary that all articles contaminated by tubercular human beings or animals, their abodes, and their excreta, should be thoroughly and completely disinfected in order to prevent the dissemina-

tion of the disease. In this work we have a powerful ally, the sun; as Koch says, "Direct sunlight quickly kills bacteria, the tubercle bacilli for example. Even daylight produces the same effect, though more slowly."

Moreover, as tuberculosis may be communicated by the presence of the bacilli in the beef and milk of consumptive cattle and the flesh of affected poultry, inspectors should be appointed by law to periodically examine the live-stock of their several districts, to inspect the dairy premises, and inquire into the conditions under which the milk is prepared to be shipped to the consumer. Ollivier recently read a paper before the Paris Academy on the dangers of milk tuberculosis. He states that in a convent school at Chartres, six out of thirteen scholars had become successively tuberculous during the preceding four years. On inquiry he ascertained that the milk-supply of the school had for some years been derived from a cow having a tuberculous udder. This milk had been consumed daily in an unboiled condition by the inmates of the school.

In regard to the liability of infection from poultry, a case has been related. The patient, of tubercular parentage, suffering from pulmonary phthisis, told that she had eaten at various times eleven underdone roasted chickens, obtained from a neighbour who was phthisical, and for whose expectoration the chickens always fought. The connection is obvious.

Geographical position plays a considerable part in the distribution of the disease. In cold regions it is comparatively rare; in the tropics, very acute and violent in character. Beckler advances the theory that excessive summer heat is an active producing cause of tubercular phthisis pulmonalis, including tubercle in whatever structure or tissue it may be found. Altitude is of much importance. For example: At low levels, dense populations, bad hygiene, and certain occupations are potent factors in the extension of the disease, whereas in the Alps and all mountainous regions these have little or no effect.

The inhalation of air laden with bacilli from dried sputa is probably the most common method of infection; and in this connection it is certainly proper to take into consideration the hygienic conditions of street-car and railway travel. Examination of the floor of a street car after only one trip reveals a layer of filth of which a not unimportant constituent is expectorated matters. Sometimes after each trip a car is given a superficial brushing out, which only means that the rougher dirt is removed. It is customary on some, at least, of the street-car lines in New York to wash the cars out after the last trip at night. This, however, is only superficially done, and sometimes not at all. The railway-car service is in the same condition, only worse. There is no doubt but that these two great carriers of the public are also great disseminators of disease; and to remedy this it seems to me that the suggestions of Dr. Conn in a recent number of the *Railway Review* merit attention. He recommends that railway coaches be flooded with steam (I would suggest, daily) by means of a hose which may be attached to a locomotive. In the case of the street cars a stationary engine should be situated in each car stable, to furnish the necessary steam. A jet under pressure of twenty-five to fifty pounds will be sufficient to render the accumulated germs innocuous.

Another abomination, the cuspidor,—a filthy object, and, unhappily, a seeming fixture,—should be abolished. A substitute for it may be found in the small paper cup, which is easily obtained, and after use should be destroyed by fire.

A patient suffering from this disease is himself a constant menace to the health of his friends; and while on this point, I may say that this theory is not a new one, for over one hundred years ago the faculty of Naples decided that phthisis was communicable, and, in consequence, patients were isolated—driven from home—and shunned, while we of the nineteenth century, recognising likewise the danger of contagion, instead of driving the suffering out to die like abandoned animals, bring to their aid the hygienic and thera-

peutic advantages of our day. Certainly a great deal has been done to this end during the past decade.

Since Koch made known his great discovery of the bacillus tuberculosis, all of the efforts of the profession have been directed toward the destruction and elimination of the germs; but it was left to Koch himself to attempt a cure, not by destroying the bacilli directly, but the tuberculous tissue surrounding them. Time alone will determine the value of this measure. To-day, on insufficient evidence, it is almost universally condemned, not only as of no use, but as positively harmful. I believe, however, that its place will eventually be found, and that it will be fully received as a valued addition to our means of destroying tubercular disease.

The series of experiments with tuberculin and other agents, detailed below, were carried on in Charity hospital. The class of patients, the pauper sick, which comes to us there, is the most unfavourable for the purposes of special investigation. Subject all their lives to unhygienic surroundings, with improper and scanty food, uncleanly, insufficiently clad, ignorant, and careless regarding the most common laws of health, it is not strange that the medical wards of Charity are full of a class with which it is impossible to obtain the best results in any line of treatment. To be sure, these individuals, taken out of their crowded tenements, washed, provided with clean clothing and a certain amount of milk and other food, will improve for a time on almost any variety of treatment; but after a while their previous unfavourable mode of life tells, and renders them almost hopeless as subjects for experiment. The cases treated with tuberculin were nine in number,—two pulmonary and laryngeal tuberculosis, and seven pulmonary tuberculosis,—the object being to inoculate only a few, to the end that careful observations of these might be made, and result in statistics of some service. Previous to the primary inoculation of each case, a full history of the patient was taken; the physical examination, examination of sputum for bacilli, weight, temperature, pulse, and respiration noted; and after inoculation,

the temperature, pulse, and respiration were observed every two hours from 7 a. m. to 11 p. m. In the beginning of the treatment, each case received a primary dose of .0005; but in no case getting a reaction from this, I abandoned it for one of double the amount; and the rule employed, was that unless the temperature reached 103° during the period of reaction, the dose was increased by .001 with each succeeding inoculation, every second or third day, according to the length of the reactionary period. As will be observed, this rule was not carried out in all of the cases, for unavoidable reasons. In all of the cases bacilli were found in the sputa.

The method employed in this examination was the following:

Prepare two solutions, *A* and *B*.

$$A = \begin{cases} \text{Fuchsin,} & 1 \\ \text{Absolute alcohol,} & 10 \\ \text{Aq. distil.,} & 100 \\ \text{Acid. carbol.,} & 5 \end{cases} \qquad B = \begin{cases} \text{Methylene blue,} & 2 \\ \text{Aq. distil.,} & 100 \\ \text{Acid. sulphur. dil.,} & 25 \end{cases}$$

Place some of the sputum to be examined on a slide, then another slide on top of it, and squeeze them together. Pour on some of solution *A*, and heat over a lamp until it steams; then wash in pure water, and dry on blotting paper. Now pour on solution *B;* count thirty; wash in pure water, dry, and examine.

The cases were as follows:

Case I. M. G., female, aet. 33 years—pulmonary tuberculosis:

Physical Examination: patient fairly nourished; temperature, 99.4°; respiration, 30; pulse, 88.

Auscultation: right lung—bronchial breathing anteriorly, crepitant and subcrepitant râles over entire lung, more marked at apex; posteriorly, bronchial breathing and crepitant râles over apex, also pleuritic friction sounds; left lung—anteriorly bronchial breathing in upper lobe, with fine moist râles in lower; posteriorly, bronchial breathing over upper lobe, crepitant and subcrepitant râles with pleuritic friction sounds over apex.

Percussion: slight dulness anteriorly on left side; posteriorly, marked dulness over apices and interscapular region.

Patient complained at this time of sharp pain under left scapula; she had severe night sweats, cough, and expectoration, and the sputum contained bacilli.

I have noticed that in almost all cases where the lymph has been employed, a marked drop in temperature has taken place within a short time after the inoculation, varying from about two to six hours; then the temperature commences to ascend. So in the tables I have placed the lowest and highest temperatures obtained, together with the amount of the original solution and the date.

Date.	Lymph.	Lowest temperature.	Highest temperature.
January 22.	.001	97.3	99.0
" 24.	.002	97.1	100.0
" 26.	.003	98.0	99.1
" 28.	.004	98.0	100.4
" 31.	.005	98.3	100.0
February 3.	.006	98.0	101.2
" 7.	.007	98.4	99.4
" 13.	.008	98.0	99.0
" 17.	.009	98.0	99.2
" 21.	.01	97.3	99.2
" 25.	.011	97.4	101.3
March 4.	.012	97.4	100.2
" 7.	.013	97.4	99.4
" 10.	.014	97.1	99.2
" 13.	.015	97.0	98.4

It was not until after the sixth inoculation that marked reactionary symptoms occurred, although after all, including the first, the patient experienced pain in the joints. During the treatment a gradual but marked improvement in the physical condition of this patient was observed, the cough ceased, also the expectoration and night sweats, and a slight gain in weight was noted. When the inoculations were discontinued a physical examination revealed the following:

Percussion: negative.

Auscultation: left side—respiratory murmur diminished; right side—respiratory murmur fair, expiration not continuous with inspiration, no râles; vocal resonance slightly increased.

Case II. D. S., male, aet. 34—pulmonary tuberculosis.

This patient suffered from an attack of the prevailing influenza, one year prior to his admission to the hospital; has had a slight haemoptysis; coughs, expectorates a great deal, and has suffered from night sweats for the past six months.

Physical Examination:

Percussion: dulness at both apices.

Auscultation: bronchial breathing and voice, and subcrepitant râles at both apices, on left side to level of third rib.

Temperature, 98.5°; pulse, 104; respiration, 18.

Microscopic examination of sputum shows bacilli in considerable numbers. Weight, 177 pounds.

Date.	Lymph.	Lowest temperature.	Highest temperature.
December 27, 1890.	.0005	98.2	99.0
" 30, "	.001	97.3	98.2
January 2, 1891.	.002	97.3	99.0
" 4, "	.0025	97.2	99.0
" 6, "	.003	97.0	101.0
" 9, "	.004	97.0	100.2
" 14, "	.0045	97.1	100.1
" 17, "	.005	98.2	101.0
" 21, "	.006	97.3	101.0
" 24, "	.007	97.2	100.0
" 27, "	.008	97.0	99.0
" 30, "	.009	96.4	99.4
February 3, "	.01	97.0	99.0
" 5, "	.011	96.2	99.1
" 9, "	.012	97.0	98.3
" 13, "	.013	97.4	100.0
" 18, "	.014	98.0	99.1
" 21, "	.015	97.0	99.0

It was not until after the inoculation of January 6 that the patient experienced any decided reaction which was very marked, and after this the cough began to diminish.

January 19. An examination revealed the fact that the dulness had disappeared from the left apex, when the breathing had become vesicular, though rough; and on the right side, the dulness is less marked and the respirations more vesicular.

January 20. A slight icterus was developed, accompanied by a papular eruption on left shoulder and back; weight of patient, 179 pounds. The night sweats now began to disappear, and a steady improvement in patient's condition took place until February 21, when the last inoculation was made, at which time there were no night sweats or cough, and but slight expectoration,—which, however, still contained bacilli.

The physical examination on February 25 resulted as follows:

Left side—almost normal, expiratory sound slightly prolonged; right side—percussion negative, expiratory sound slightly roughened and prolonged, also broncho-vesciular respiration above first intercostal space.

Case III. J. F., male, aet. 42 years—pulmonary tuberculosis.

This patient has had a cough and pain in left supraclavicular region for three years, also has had dyspnoea on exertion, night sweats and diarrhoea, and expectorates a great deal of tough, tenacious mucus.

Physical Examination:

Palpation: increased vocal fremitus over right upper chest.

Percussion: dulness over right lung in front to level of fourth rib, behind to tip of scapula, also over left lung to third rib in front, and to middle of scapula behind.

Auscultation: bronchial breathing, and subcrepitant râles over the above mentioned areas.

Examination of sputum revealed bacilli.

Date.	Lymph.	Lowest temperature.	Highest temperature.
December 27, 1890.	.0005	98.2	98.4
" 30, "	.001	97.2	99.0
January 2, 1891.	.002	97.4	100.0
" 4, "	.0025	98.2	101.1
" 6, "	.003	98.2	101.0
" 9, "	.004	97.4	102.0
" 14, "	.0045	98.0	102.0
" 18, "	.005	96.4	100.0
" 21, "	.006	97.4	101.2
" 25, "	.007	98.2	100.3
" 30, "	.008	97.2	100.0
February 3, "	.009	98.2	99.0
" 5, "	.01	98.0	99.2
" 9, "	.011	97.4	98.2
" 13, "	.012	97.4	99.3
" 18, "	.013	98.0	98.2
" 21, "	.014	98.0	100.2

The patient had the characteristic reactions. The expectoration rapidly lost its tenacious quality, and became more abundant; sweating stopped after the seventh inoculation; and at this time a physical examination resulted as follows:

Dulness only down to level of second rib on left side, and breathing in this area is bronchial above the clavicle, and broncho-vesicular below; no râles. On the right side the dulness extends to middle of third interspace, and breathing is sonorous and bronchial; there is also a dull spot under left axilla, marked by bronchial breathing but no râles. The cough nearly entirely disappeared at this time.

After about the tenth inoculation, however, the cough recommenced,

and was accompanied by night sweats, and diarrhoea set in. The patient was weighed now, and a loss of 6½ pounds was noted.

The erythema, which is sometimes observed in these cases, was well marked at this time. All of the symptoms, including the diarrhoea, remained about the same until February 5, when the night sweating ceased, and the cough became much less frequent; still, however, the expectoration continued to be considerable.

February 8. *Physical Examination:*

Percussion: left side—dulness to upper edge of second rib; right side —dulness above clavicle.

Auscultation: left side—bronchophony and broncho-vesicular breathing to third rib; right side—the same to second interspace; no râles.

From now until the inoculations were stopped on February 21, the patient's condition remained about the same, with but little cough or expectoration; patient left hospital of his own accord.

Case IV. G. F., male, aet. 48 years—pulmonary tuberculosis.

Gave a history of several attacks of haemoptysis extending over three years, with cough and expectoration of thick, whitish mucus; during past three months had night sweats.

Physical Examination:

Percussion: dulness on right side to fifth rib, and behind to tip of scapula; on left side, dulness to fourth rib in front, and to middle of scapula behind.

Auscultation: brochial breathing; bronchophony and whispering bronchophony throughout the dull areas; friction sounds in various parts of chest; the sputum contained bacilli. Weight, 125 pounds.

Date.	Lymph.	Lowest temperature.	Highest temperature.
January 15.	.001	98.2	98.2
" 18.	.002	96.3	98.2
" 21.	.003	97.3	99.3
" 24.	.004	97.0	99.2
" 27.	.005	97.2	100.4
" 30.	.006	97.0	99.3
February 3.	.007	98.2	101.2
" 7.	.008	97.1	99.2
" 9.	.009	97.0	99.0
" 13.	.01	97.4	101.1
" 18.	.011	97.3	99.1
" 21.	.012	97.0	100.1
" 25.	.013	97.3	99.0
" 28.	.014	97.1	99.0
March 4.	.015	98.0	100.0
" 7.	.016	97.0	99.0

By about the middle of February the patient had but little cough or expectoration, and only occasional night sweats.

March 3, a physical examination revealed roughened breathing on left side, most marked at upper part. No bronchial breathing as at last examination,—more vesicular in character. There is manifest a steady improvement in this side. On the right side there is less dulness than at former examination; bronchial breathing only to second rib; a few moist râles at apex. Weight, 126 pounds, a gain of one pound; and when the inoculations were stopped, a great change for the better had taken place in this patient's condition. There were no night sweats, and but slight cough and expectoration.

Case V. C., male, aet. 39 years—pulmonary tuberculosis.

Physical Examination:

Palpation: increased vocal fremitus over left upper lobe and whole of right chest.

Percussion: dulness over right chest in front and behind to about level of nipple; dulness over left lung to level of fourth rib.

Auscultation: bronchial breathing, voice, and whisper, over whole of right lung before and behind, and subcrepitant râles; bronchial breathing, voice, and whisper over left upper lobe. Weight, 113 pounds. The sputum contained bacilli.

Date.	Lymph.	Lowest temperature.	Highest temperature.
January 4.	.001	98.0	99.4
" 6.	.0015	97.0	98.2
" 9.	.0025	97.0	99.0
" 12.	.0035	97.3	99.0
" 17.	.004	99.0	100.1
" 21.	.005	98.2	100.0
" 24.	.006	98.2	99.4
" 27.	.007	98.0	100.1
" 30.	.008	98.0	99.4
February 3.	.009	98.1	99.4
" 5.	.01	97.3	99.4
" 9.	.011	98.2	99.3
" 13.	.012	98.2	100.3

This case did badly from the start. The cough, expectoration, and night sweats rapidly increased under treatment; his appetite diminished; he complained greatly of pain in the chest and occasionally in the abdomen. There was also more or less diarrhoea after the seventh inoculation, a characteristic erythematous eruption over breast and sides of chest. On February 4 the left testis appeared swollen and painful.

February 8. The following was the result of the physical examination made to-day:

Percussion: dulness on right side, the same as in previous examination; on the left, reaches the third interspace.

Auscultation; bronchophony to third interspace, whispering bronchophony to second rib, and bronchial breathing; broncho and bronchovesicular breathing from second rib to third interspace on the left side; on the right side, the only change is cavernous breathing above the clavicle. The patient's condition rapidly grew worse; he decreased in weight, and on February 24 he was sent home.

Case VI. J. B., male, aet. 40 years—pulmonary and laryngeal tuberculosis. At the time of the first inoculation, the patient's general condition was as follows:

Dyspnoea on exertion, cough, expectoration of greenish white material, most profuse at night; husky voice first noticed a year previously; improved for a while, but had grown steadily worse during past three or four months. This patient also had night sweats and occasional chills.

Laryngeal examination; puffiness of arytenoid prominences, marked anaemia (phthisical) of arytenoid folds, injection of both vocal cords, with infiltration (Dr. Jarvis).

Examination of sputum showed the bacilli in abundance. Weight, 129 pounds.

Inoculations as follows:

Date.	Lymph.	Lowest temperature.	Highest temperature.
January 18.	.0005	99.2	100.2
" 22.	.001	98.0	99.4
" 24.	.002	99.2	102.1
" 28.	.003	98.4	101.1
" 31.	.004	99.2	103.0
February 3.	.004	99.0	101.2
" 6.	.004	99.4	100.4
" 14.	.005	101.0	101.3
" 17.	.006	99.2	101.4
" 21.	.007	99.3	101.4
March 6.	.007	99.3	102.1
" 13.	.007	98.2	102.0

The patient from the beginning complained much of the throat's feeling sore, associated with more cough than usual, considerable headache, and vertigo; and the voice became weaker and more hoarse.

February 10, an examination showed an increase in the infiltration and congestion of the right ventricular band.

February 18, there was increased puffiness of laryngeal mucous mem-

brane, particularly of right ventricular band, which showed a white nodule.

The cough and expectoration increased; night-sweats continued, and on March 5, an examination showed an increased nodular infiltration, with signs of commencing disintegration of the vocal cords (Dr. Jarvis).

March 14 the patient was weighed, and was found to have lost ten pounds since the treatment was begun, and it was thought best to discontinue the inoculations.

This patient's chart differed from all the others in the fact that there was a total absence of the preliminary drop in temperature before it commenced to ascend after the inoculations.

Case VII. M. W., aet. 28, female—pulmonary and laryngeal tuberculosis.

At the time of the primary inoculation, the patient's condition was as follows: Husky voice, moderate cough chiefly in morning, yellowish muco-purulent expectoration not very abundant, and dyspnoea on exertion. Bacilli were present in the sputum.

Laryngeal Examination:

Slight injection of right vocal cord, trachea pale; localised hyperaemia of right arytenoid fold; general color pale (Dr. Jarvis).

(The temperature rose immediately after each inoculation, preceding the customary drop. This, I think, may be ascribed entirely to nervous influences.)

Date.	Lymph.	Lowest temperature.	Highest temperature.
January 18.	.0005	98.2	100.4
" 21.	.001	98.0	100.3
" 24.	.002	100.2	101.2
" 28.	.003	98.0	101.1
" 31.	.004	98.2	101.2
February 3.	.005	97.4	100.1
" 6.	.005	99.1	100.4
" 14.	.006	100.0	101.3
" 17.	.007	99.0	102.0
" 21.	.007	97.0	101.0
" 24.	.007	98.0	100.3
March 2.	.007	97.4	100.1
" 5.	.007	98.4	100.4
" 9.	.007	98.0	100.4
" 13.	.007	97.2	101.0
" 17.	.007	100.2	104.1

After each inoculation the patient complained of pain and soreness in the larynx and considerable dyspnoea.

February 10, on examination no change was noted, except an intensification of the hyperaemia of the parts.

March 11, the vocal cords were much paler (Dr. Jarvis), at which time the hoarseness of voice began to increase in intensity, the cough became more troublesome, and the patient complained of a feeling of choking when she coughed.

March 15, there was a slight improvement manifest; but as no perceptible good seemed to be derived from the treatment, it was discontinued.

Case VIII. J. O., male, aet. 18.—pulmonary tuberculosis.

Physical Examination: vocal fremitus slightly increased on both sides. Percussion: slight dulness over upper lobe of right lung, and over upper lobe of left lung.

Auscultation: respiratory murmur approaching broncho-vesicular at right apex; voice increased at both apices; whispering bronchophony at right apex; subcrepitant râles over anterior and posterior surface of right upper lobe, and a few mucous râles at left apex.

The sputum contained bacilli.

Date.	Lymph.	Lowest temperature.	Highest temperature.
February 18.	.001	97.2	100.2
" 21.	.002	97.0	103.2
" 25.	.003	98.0	104.0
March 4.	.004	97.0	103.2
" 9.	.004	97.2	99.4
" 13.	.0045	98.0	104.0
" 17.		98.0	100.4
April 1.		97.3	99.2
" 6.		97.0	99.0
" 15.	.01	97.3	99.0
" 17.	.01	98.0	99.0
" 20.	.011	98.2	99.2
" 27.	.012	99.0	100.4
" 29.	.013	98.0	101.2
May 1.	.014	98.2	98.4
" 3.	.015	98.2	99.3
" 5.	.016	97.1	98.3
" 8.	.017	98.0	98.3
" 11.	.018	97.3	98.2
" 13.	.019	97.2	99.0

Owing to the imperfect manner in which the charts and history of this ase were kept for about a month, the record of doses during that time has been lost.

This case is exceedingly gratifying in its results, and demonstrates well the efficacy of Prof. Koch's remedy. At the time of the first inoculation, the patient had considerable cough and a great deal of expectoration, streaked occasionally with blood, together with dyspnoea, and pain in chest, all of the symptoms constantly becoming more aggravated. With these there was associated a loss of flesh and strength.

About the middle of March the patient had an attack of the prevailing influenza, during which he lost weight, and his other symptoms were unfavourable.

April 2. *Physical Examination* resulted as follows:

Increased vocal fremitus on right side.

Percussion: dulness at right apex.

Auscultation: bronchial voice and breathing, with a few subcrepitant râles at right apex anteriorly; some subcrepitant râles also heard posteriorly at both apices.

A steady improvement began now in all the symptoms.

May 11. General condition of patient is very good; coughs but little; small amount of expectoration; no night sweats; no reaction after inoculation.

June 1. *Physical Examination:*

Palpation: vocal fremitus seems to be slightly increased at right apex.

Percussion: slight dulness on left side anteriorly; right side—slight dulness at apex.

Auscultation: right side—slight friction at apex; left side—slight friction sounds to lower border of fifth rib, over anterior surface.

Discharged, to return in a month for examination.

Case IX. W. D., male, aet. 34 years—pulmonary tuberculosis.

Gave a history of a haemoptysis four years ago; thinks he lost about a pint. He recovered gradually, and was pretty well until about three months before inoculations were begun, when cough, accompanied by a bloody sputum and night sweats, made its appearance. He had a small haemoptysis about once a week regularly, and the muco-purulent expectoration was generally streaked with blood. He was losing flesh and strength.

Physical Examination:

Percussion: slight dulness at apices, also over subclavicular region of right lung.

Auscultation: left lung—broncho-vesicular respiration, with a few subcrepitant râles over anterior surface, also a few mucous râles; right lung—bronchial breathing over anterior and posterior surfaces, over this area subcrepitant râles are scattered, which are particularly numerous in the subclavicular region.

Temperature, 100.2°; pulse, 84; respiration, 17; weight, 141 pounds.

Date.	Lymph.	Lowest temperature.	Highest temperature.
January 29.	.001	99.0	100.3
" 31.	.002	100.0	101.0
February 4.	.003	99.0	100.2
" 13.	.004	99.3	100.3
" 18.	.005	99.2	103.2
" 21.	.005	98.2	101.2
" 25.	.005	99.0	101.2
March 4.	.006	98.2	101.2
" 7.	.007	99.0	101.0
" 10.	.008	97.3	100.4
" 13.	.009	97.4	100.0
" 29.	.01	101.0	103.0
April 1.	.01	101.2	102.0
" 15.	.01	101.0	102.0
" 17.	.01	100.0	101.4
" 20.	.011	99.3	101.3
" 27.	.012	99.3	102.0
" 29.	.013	98.1	101.2
May 1.	.014	98.4	99.3
" 3.	.015	98.4	99.4
" 5.	.016	97.2	99.2
" 8.	.017	99.2	100.0
" 11.	.018	98.0	100.0
" 13.	.019	98.2	100.2

The last week in March this patient had an attack of influenza which rapidly brought down his weight, which, however, he soon recovered. He improved rapidly; his cough and night sweats diminished; and only a couple of times since the treatment began has he spit blood.

June 1. *Physical Examination:* vocal fremitus increased on right side. Percussion: very slight dulness to third intercostal space of left side, in front, and slight dulness in suprascapular region behind; right side—dulness at apex, in axilla, and behind in suprascapular region.

Auscultation: left lung—roughened breathing over upper lobe; right lung—in front, bronchial breathing to about fourth rib, also in axilla, and behind in suprascapular and interscapular regions; bronchial voice and whisper over upper portion, and a few subcrepitant râles scattered over this area.

This case is still under treatment. The night sweats have entirely ceased; his appetite is excellent; he sleeps well, coughs but seldom, and there is very little expectoration.

It is, perhaps, as well to state now that at no time during the treatment did any of these patients receive anything else in the way of remedial agents.

RECAPITULATION.

CASE I. Under treatment about two months; maximum dose .015; improved.

CASE II. Under treatment about two months; maximum dose .015; greatly improved.

CASE III. Under treatment about two months; maximum dose .014; improved.

CASE IV. Under treatment about two months; maximum dose .016; much improved.

CASE V. Under treatment about six weeks; maximum dose .012; grew worse.

CASE VI. Under treatment about two months; maximum dose .007; grew worse.

CASE VII. Under treatment about two months; maximum dose .007; improved, then worse.

CASE VIII. Under treatment about three months; maximum dose .019; apparent cure.

CASE IX Under treatment about three and one half months; maximum dose .019; apparent cure.

Thus we have of these nine cases,—

Three which became worse under treatment;

Two improved;

Two very much improved;

Two improved so they were to all intents and purposes well.

In considering this treatment, therefore, it seems to me, in the light of the experimentation with these few cases, that tuberculin is clearly a remedy, which, if employed in the early stages of the disease, may retard its progress and prolong life, and in some instances exert a curative influence.

The antiseptic treatment of phthisis has attracted general attention during the past few years, and to a brief consideration of its merits we will now turn.

It consists essentially of the employment of germicidal agents by means of the stomach, by inoculations, and by inhalations. My own experience with these remedies has resulted in a measurable degree of success. I have employed creosote alone, and in combination with terebene, in thirty-one cases of which I have record. The remedies were administered, first, terebene, five to ten drops every three

hours, generally given in milk, as thereby it was found to be less irritating to the stomach. In other cases this was supplemented by inhalation of creosote and terebene in the proportion of 1 to 150; fifteen drops of this mixture used in a Robinson's inhaler every three hours. In other cases the inhalation of creosote and terebene was used in conjunction with the internal administration of creosote, and I think that this latter combination was the more useful.

As a rule, the patients did fairly well under the treatment; the appetite improved, night sweats diminished or entirely disappeared, cough lessened, the expectorated material was thinner, and the general condition of the patient seemed improved. Practically, however, the signs in the lungs went steadily on, but not with the rapidity noticed before. I think that the treatment distinctly prolonged life by retarding, while not stopping, the course of the disease;—indeed, it was the subject of general remark in the hospital, that while there was as much phthisis as ever, there was not nearly so much coughing as formerly in the wards, and there were not so many deaths.

A very earnest and persevering worker in this field—Dr. Vincent Harris, of London—states that he agrees with those who assert that the exhibition of medicines by the mouth is seldom of value in arresting tubercular processes in the lung, for the reason that the drugs are not absorbed in amount sufficient to effect a change in the tissues, and to prevent the growth of the baccilli, or to neutralise or render harmless the products arising from the life of the micro-organisms. He believes, however, that the most reasonable method of introducing antiseptic substances into the lungs short of inoculation, is by inhalation. He says "they appear to diminish the expectoration and greatly to lessen the cough, and almost certainly disinfect the air passages." These conclusions entirely coincide with the results of my own observations.

The majority of observers now agree that the true method of medication in pulmonary tuberculosis is by inoculation, as by this means alone is a sufficient amount of the drug

absorbed; and to this end there have been many experiments made, and with many agents, with a certain degree of success. Whether inoculations of tuberculin or some other remedy are made to destroy tuberculous tissue, or of a germicide to destroy the bacillus, we shall doubtless obtain better and quicker results in a very discouraging field of labour by the coincident employment of the inhalation of antiseptic vapours.

FRACTURE AND DISLOCATION OF THE VERTEBRAE.

By Chas. W. Brown, M. D., of Washington, D. C.

October 29, 1891.

The unfortunate individual who receives an injury of the spine sufficient to produce dislocation or fracture, or both dislocation and fracture, is the most melancholy of all the cases the surgeon has to contend with, and he appeals to the sympathy of every one who beholds him. If he were crushed and killed outright, he would not present a more sad picture than he does with the lower part of the body practically dead and the upper part alive.

They usually lie on the back until large bed-sores form, and cystitis usually contributes to their misery until death brings the only relief to their sufferings. This is the result especially in those cases where the cord is partially or completely divided, or its functions entirely destroyed by contusion or pressure.

These injuries are somewhat allied to injuries of the brain, in so far as the paralysis is concerned, though loss of conciousness, delirium, and other symptoms of cerebral compression are usually wanting.

In the treatment of this class of cases, the most important thing is to restore the bones to their normal position as speedily as possible, and to elevate or remove fragments of bone which press upon the cord by cutting down upon the fractured vertebrae.

Dr. Hadra, at a meeting of the American Orthopaedic Association, recently held at Washington, suggested that the spinous processes be exposed, and firmly wired together to secure rest and prevent deformity. He had performed the

operation for fracture of the spine, and it was extremely simple and effective.

Dr. Sayre thought the wires would not bear enough force to remove the weight from the vertebral bodies, and that outside protection would be necessary to prevent lateral and rotary disturbance.

Plaster cast, starch bandage, and various kinds of splints are of service to prevent motion and relieve pressure.

Extension and counter-extension, the suspended cot or hammock, and the water-bed serve a good purpose in appropriate cases.

It matters not how severe the injury nor how profound the shock: if the patient is still alive it would be a proper procedure to give stimulants and immediately administer ether, and make an attempt to reduce the dislocation by extension and manipulation, or by bending the spine across the knee or other fulcrum, and, if these fail, to cut down upon the vertebra, accomplish reduction, and remove any fragments of bone that are likely to become necrosed, or that are pressing upon the cord. This is rendered a much safer procedure since the advent of antiseptic and aseptic measures.

A careful study of the clinical history of a large number of cases of fracture and dislocation of vertebrae and the post-mortem appearances would indicate that union of the cord is not likely to take place after it has been divided, no matter what plan of treatment is pursued; but in those cases which recover and gradually regain the use of their paralysed limbs, the loss of function is produced by concussion of the cord or pressure, without division of the columns of the cord, so that after removal of the pressure the functions of the cord are gradually restored.

November 18, 1889, P. C., brakeman, a large, muscular man, aged 25 years, three hours before I saw him was standing upon the top of a box car, while backing upon a side-track, and when they "took up the slack" he was thrown to the ground and struck in a sitting posture. The car backed over him, the brake beam came across his back and pushed him along until his heels caught on a high tie, and he was doubled up under the brake beam. He was immediately taken to his boarding-place at

Elmira, where I found him suffering from shock; face pale, covered with clammy perspiration; pulse rapid, very weak and irregular; respirations catching, sighing, and shallow; complete paralysis of both sensation and motion below seat of injury. The right arm was also partially paralysed; though he could move it, he said it felt numb and heavy. He complained of a sensation of rigidity and tension, with severe pain at point of injury, extending thence up to his head. A few minutes after I arrived he was seized with a severe convulsion, which affected both arms and the muscles of the upper part of the body, though the convulsive movements were quite general and lasted for several minutes; he was unsconscious for several minutes.

The fifth dorsal vertebra projected backward over the sixth, nearly the whole width of the bone. There was considerable haemorrhage beneath the tissues. Gave stimulants freely; applied artificial heat to the body and limbs by means of bottles of hot water and flannel blankets; then gave ether; raised him clear from the bed with windlass hammock, put a strong tractor around his body above the hips and another under the arms, and attached them to ropes secured at both ends of the room on a level with the body, and by means of a compound pulley made very firm traction, while, by manipulation, crepitus was distinctly made out. It was not until very great force was used, by means of the ropes, that the vertebra could be moved from its new position; but when the body was drawn until it was perfectly straight, I finally succeeded in replacing the dislocated vertebra, which relieved the deformity entirely except some enlargement due to haemorrhage into the tissues. Extension was discontinued, and he was lowered to the bed; and after the effect of the ether had passed away, it was found that there was slight sensation in both legs over every part,—most acute in left,—but there was not the slightest power to move either leg. The morning of the 19th found he had rested quite well during the night, but since waking had suffered considerable pain at the seat of injury and extending through to the epigastrium. His face had a pale, anxious look, pulse was rapid and irregular, respirations laboured and shallow, and there were frequent spasmodic movements of the muscles of the face and arms. On the third day the temperature reached 102°, and remained so for two days, then dropped to 101° or less. From the fifth day he was quite comfortable. The urine was drawn by catheter thrice daily, and the bowels evacuated by enemata. He was raised by the windlass two or three times every twenty-four hours, and his back bathed with whiskey or alcohol. Sometimes he was allowed to remain elevated from the bed for an hour or more at a time, as this relieved both pressure and pain. Air-pillows, pads of cotton and oakum, were placed under his back; but in spite of all precautions, a small bed-sore formed over the right gluteus muscle before I moved him to his home in Maryland, which was Decem-

ber 4. He bore the journey home very well, and seemed none the worse for it. I heard from him occasionally, and he was reported as improving, except that cystitis gave considerable trouble, and it was with great difficulty that his bowels were evacuated. He was removed to Providence hospital in Washington, D. C., March 13, 1890. Dr. Koons, who was in charge, says that he improved somewhat by the daily use of galvanism, was able to move both feet, and had sensation in both legs; but toward the latter part of June he suddenly commenced to fail, and died of exhaustion on June 29, seven months and eleven days from date of injury. There was extensive sloughing of the nates and back of the thighs during his stay at the hospital, but no abscess formed at the seat of injury.

No autopsy was made, and I was not aware of his death until several months afterwards.

I have been able to find the records of one hundred and twenty-three cases of fracture and dislocation of the vertebrae, and below give the references.

Eighty-four were cervical; thirty, dorsal; seven, lumbar; and two did not state the location.

Of eighty-one cases, thirty-six recovered and forty-five were fatal. These figures would tend to show that a large number of the fatal cases are never reported, while the favourable ones are nearly all recorded.

Allington, Herbert, London. Journal American Medical Association, 1889, p. 661.—Case 1, fracture of spine, paralysis below seat of injury. The spine was trephined through an incision ten inches long, and with the bone forceps the depressed laminae and spinous processes of the fifth, sixth, and seventh vertebrae snipped off, exposing the cord for about four inches; wound was dressed antiseptically, and healed in about ten days. Some improvement followed, and the level of the paralysis was brought down to the level of the umbilicus.

Case 2 was brought to the hospital on account of a fall. She was paralysed from a level seven inches above the umbilicus. Six days later, Mr. Allington removed the spinous processes and laminae of the third, fourth, fifth, and sixth vertebrae, and, as the cord was found to be crushed, the dura mater was opened. The wound healed up, except in the track of the drainage tube, in about a fortnight. The patient, a woman, died seven months later, from bed-sores, cystitis, etc.

The cord was found to be almost divided.

Freeman.—Fracture in the cervical region, resulting in bony anchylosis and final recovery. New York Medical Journal, Vol. XXIII, p. 294.

Murdoch, J. B.—Fracture of the vertebrae in the lower dorsal and upper lumbar region; also just such a fracture as this, except the deformity was more marked. Journal American Medical Association, Vol. XII, 1889, p. 698.

Teale, J. W.—Reported a remarkable case at a meeting of the Clinical Society, of London, of a woman who fell under a horse, sustaining a fracture of the fifth and sixth ribs at about their middle, and an injury to the spine. Up to November 1, the temperature never exceeded 101°, but on that day began to rise gradually until it reached, on November 7, 107°. The respirations were unaffected, and the pulse did not exceed 100. On November 8, the temperature was 108°, on the 11th, 12th, and 13th, respectively, it was 111°, 113°, and 114°, while on the 14th it was at least 125°, that being the most that the thermometer would register. Five times between that date and December 1, the same extraordinary temperature was reached. During December the temperature never fell below 108°, but early in January, 1875, it began to go down. Seven different thermometers were used at different times. The patient recovered.

Keyes, E. L.—G. H. McM., aged 28 years, fracture twelfth dorsal vertebra. The spinous process and laminae of the eleventh, and the spinous process of tenth dorsal vertebra, were removed, the latter simply to give room to work in. There was found a slit in the dura about one fourth of an inch in length. After removal of the bone the cord was entirely free from pressure. Patient died on the afternoon of the seventh day. New York Medical Journal, 1885, p. 22.

Dr. L. W. Bliss (Transactions Michigan State Medical Society) reports the following case:

"A man aged 41 years, was superintending the raising of a stick of timber under which he had his shoulder, when it fell carrying him beneath it, forcing his breast forward upon his knees, dislocating the spine at the eleventh dorsal vertebra, and fracturing the ninth, tenth, and eleventh ribs at the surgical neck, also the spinous process of the eleventh dorsal vertebra. He was removed from beneath the timber in an almost insensible condition, from which he recovered in about one half hour with complete paralysis of that portion of the body below the dislocation. An attempt was made to replace the vertebrae by pressure, which failed, and extension and counter-extension were followed by the same result. The surgeon then knelt upon the floor, and, stationing assistants at both extremities of the patient, he directed the body to be forcibly flexed over his knees as a fulcrum, while one hand was placed under the dislocated part. In this manner, a reduction was effected, the spine resuming its natural appearance when the body was extended. In three minutes after the reduction the patient was able to move his feet, sensibility returned, and the power of motion of the legs was recovered in half

an hour. With the exception of retention of urine, lasting three days, no untoward symptoms supervened. The patient was confined to bed seven weeks, and availed himself of the assistance of crutches for five months.

Ainsworth.—Dislocation with fracture of fifth cervical vertebra; paralysis and death. Medical Times, London, 1846, p. 41.

Aldons, R. C.—Dislocation cervical vertebrae; death. Ceylun Medical Journal, Colombo, 1887–'88, Vol. I, p. 187.

Appleton, H.—Dislocation lumbar vertebra. British Medical Journal, Vol. II, 1863, p. 280.

Atkinson, J. C.—A case of dislocation between the fifth and sixth cervical vertebrae. Lancet, London, 1874, Vol. II, p. 585.

Axford, W. L.—A case of dislocation of cervical vertebrae. Ann. Anatomy and Surgery, Brooklyn, N. Y., 1883, Vol. VIII, pp. 71–73.

Ayer, D.—Complete dislocation of cervical vertebrae; reduction on the tenth day; recovery. New York Medical Journal, 1887, II, pp. 9–16.

Baker, R. L.—Dislocation cervical vertebrae. Provincial Medical and Surgical Journal, London, 1849, Vol. XIII, p. 216.

Barwell.—Subluxation of fourth cervical vertebra; recovery. British Medical Journal, London, 1882, Vol. II, p. 369.

Benfield.—Dislocation of the sixth cervical vertebra forwards with fracture of the right transverse process, fracture also of both laminae; death on the seventh day. Lancet, London, 1875, p. 346.

Adams.—Case of luxation of fifth and sixth cervical vertebrae and fracture of the body of the sixth dorsal vertebra, with much displacement of the bones and laceration of spinal cord, causing sudden and complete paralysis of the lower extremities; the upper extremities at first slightly affected, afterwards became also paralysed; death on the twelfth day after injury. Quarterly Journal Medical Science, 1848, p. 194.

Clark, A. P.—Case, fracture of the axis; partial recovery. Journal American Medical Association, Vol. III, p. 390.

Jackson, C.—Fracture and dislocation of two lumbar vertebrae; recovery. Medical Times, Philadelphia, Vol. VII, p. 132.

Crerer.—Fracture and partial dislocation of eleventh and twelfth dorsal, and the first three lumbar vertebrae. He was not paralysed, and recovered. Journal American Medical Association, Vol. V, p. 544.

Bennett, E. H.—Dislocation of the fifth cervical vertebra. Dublin Journal Medical Sc., 1879, 3d S., LXVII, pp. 260–263.

Bennett.—Dislocation of the twelfth dorsal vertebra, with fracture of the ribs and their cartilages. Dublin Journal Medical Sc., 1884, LXXVII, p. 170.

Bentley, W. H.—A peculiar case of dislocation of the sixth cervical vertebra; reduction. Medical Summary, Lansdale, Pa., 1880–'81, Vol. II, p. 95.

Bent, J. J.—Dislocation of the third cervical vertebra, with death on the fifteenth day. Medical Record, New York, 1886, Vol. XXX, p. 683.

Carter, H. R.—A case of dislocation of first cervical vertebra; recovery. Medical Record, New York, 1885, Vol. XXVIII, p. 257.

Luxation of cervical vertebrae without fracture. London Lancet, 1837, p. 134.

Ceely, T. H.—Dislocation fifth cervical vertebra; reduction, recovery. Lancet, London, 1882, Vol. II, p. 619.

Clark, H. G.—Dislocation without fracture between fourth and fifth cervical vertebrae. American Journal Medical Science, Philadelphia, 1853, Vol. XXVI, pp. 85–86.

Cleemaun.—Case of dislocation and fracture of the body of the last dorsal vertebra; the subject of the injury surviving a year, dying of pyaemia the 369th day after the accident. Proceedings Pathological Society of Philadelphia, 1871, Vol. III, p. 149.

Collins, G. L.—Case of dislocation of cervical vertebrae. Medical and Surgical Journal, Boston, 1848, Vol. XXXVIII, p. 473.

Courtney, W. M.—Dislocation of the sixth cervical vertebra, the result of injury; death fifteen hours after the accident. Indian Medical Gazette, Calcutta, 1880, Vol. XV, p. 333.

Davis, Colley N.—Case of dislocation backwards of the first lumbar vertebra, which was successfully reduced under ether. Transactions Clinical Society, London, 1884, Vol. XVII, pp. 143–146.

Doig.—Two cases of dislocation of cervical vertebrae. Edinburgh Medical Journal, August 1863, Vol. IX, p. 121.

Cohen, J. S.—Case: man aged 24 years, fourth and fifth cervical vertebrae fractured through the laminae, and the spinous processes driven in upon the cord; died the tenth day after the injury. Medical Times, Philadelphia, Vol. VIII, p. 303.

Bontecou, R. B.—Fracture cervical vertebra treated by extension and counter-extension; patient recovered so he was able to work, and lived twenty years. The report includes two similar cases in which he was not allowed to use means towards reduction, and both proved fatal. Transactions New York State Medical Association, Vol. III, p. 317.

Gouley, J. W. S.—Fracture of the twelfth dorsal vertebra and forward projection of fragment, reducing the size of the canal to three millimeters, and cutting the cord almost in two; patient lived two years. New York Medical Journal, 1889, p. 552.

Walter, G. L.—History of two cases fracture and dislocation of cervical vertebrae without paralysis, in which spontaneous recovery had taken place. New York Medical Journal, 1888, p. 499.

Acheson, A. W.—Case of luxation of cervical vertebra; reduction, recovery. American Journal Medical Science, Philadelphia, 1890, Vol. XCIX, p. 267.

Dove, J. R. B.—Dislocation fifth cervical vertebra with partial dislocation of the fourth and great injury to the cord; death in twenty-nine hours. Report London Hospital, p. 87.

Drew, J.—Dislocation without fracture of the last cervical vertebra. Lancet, London, 1850, Vol. I, p. 599.

Dwight, E. S.—A case of dislocation and fracture of the seventh cervical vertebra, with partial recovery from the paralysis, and prolongation of life for more than a year. New York Medical Journal, 1890, Vol. LI, pp. 33–35.

Erichsen, J. E.—Case of dislocation between second and third cervical vertebrae; death on fourth day. Lancet, London, 1874, Vol. II, p. 154.

Farquharson, R. J.—Bilateral dislocation of the fourth cervical vertebra forwards; death in twenty-five and a half hours. American Journal Medical Science, July, 1873, Vol. LXVI, p. 281.

Fayrer, J.—Displacement of cervical vertebrae in a child, through lifting it by the head. In his Clinical and Pathogenic Observations in India, London, 1873, p. 598.

Syme.—Dislocation of the spine at the junction of the dorsal and lumbar vertebrae; recovery. Edinburgh Medical and Surgical Journal, 1832, Vol. XXXVII, p. 335.

Dislocation fifth and sixth cervical vertebrae without fracture, air under the arachnoid: death same day. London Medical Gazette, 1831, Vol. VII, p. 541.

Johnson, S. P.—Dislocation of seventh and eighth dorsal vertebrae; reduction, recovery. Medical and Surgical Reporter, Philadelphia, 1875, Vol. XXXII, p. 24.

Ryan, J. P.—Dislocation and fracture of fourth dorsal vertebra; death thirty-seven days after. Australian Medical Journal, Melbourne, 1882, N. S., Vol. IV, p. 354.

Colles, A.—Dislocation cervical vertebrae; reduction, result favourable. Dublin Quarterly Journal Medical Sc., 1853, p. 293.

Dorrence, G.—Dislocation and fracture eleventh dorsal vertebra; terminating favourably. American Journal Medical Science, Philadelphia, 1835, Vol. XVI, p. 381.

Fleming, E.—Severe wound of head; dislocation of one of the dorsal vertebrae; amputation of left hand; amputation of right foot; death from tetanus on the eleventh day. Edinburgh Medical Journal, July and September, 1862, Vol. VIII, p. 26.

Fleming, E.—Dislocation of one of the dorsal vertebrae; wound into ankle joint on each side; recovery. Edinburgh Medical Journal, July and September, 1862, Vol. VIII, p. 28.

French, J. G.—Dislocation of the fifth from the sixth cervical vertebra; rupture of the inter-vertebral disc and pressure upon the cord. Indian Ann. Medical Science, Calcutta, 1876, Vol. XVIII, pp. 47–50.

Gilbert, D.—Two cases of dislocation of cervical vertebrae; recovery. Medical Examiner, Philadelphia, 1852, Vol. VIII, p. 218.

Gay, C. C.—Case of dislocation of fifth cervical vertebra. American Journal Medical Science, July, 1866, Vol. LII, p. 109.

Grosvenor, J. W.—Probable dislocation of dorsal vertebra; recovery. Medical and Surgical Journal, Boston, 1871, Vol. VIII, p. 251.

Thomas, W. S.—Subluxation of second dorsal and third lumbar vertebrae; partial reduction; recovery. Transactions Medical Society of California, 1876–'77, p. 176.

Tyrrell.—Dislocation twelfth dorsal vertebra. Lancet, London, 1827, Vol. XI, p. 685.

Jonathan.—Fracture seventh cervical vertebra—two cases; one died eighteen days after injury, and the other sixty hours. Medical Times and Gazette of February 27 (New York Medical Journal, Vol. XXII, p. 79).

Gerster, A. G.—A case: boy, aged 13 years, August 6, 1886, diving while bathing; head struck bottom; sustained fracture of fifth cervical vertebra; depression of spinous process with marked crepitation; treatment by extension, recovery. New York Medical Journal, 1887, p. 551.

Liston.—Dislocation sixth cervical vertebra forward; death in three days. Provincial Medical and Surgical Journal, 1845, Vol. IX, p. 724.

Harrison, R.—Dislocation third lumbar vertebra; reduction, recovery. Lancet, London, 1885, Vol. II, p. 114.

Simpson, J. M.—Displacement forward of the vertebra at lumbo-dorsal junction; recovery. Brace fitted to the back. Transactions Medical Society, New Jersey, 1872, p. 233.

Wagstaffe, W. W.—Dislocation second lumbar vertebra; death three and a half months after injury. Transactions Pathological Society, London, 1870, Vol. XXI, p. 327.

Bond, John.—Dislocation fourth dorsal vertebra; reduction, recovery. Medical and Physical Journal, 1814, Vol. XXI, p. 271.

Stone.—Fracture last dorsal vertebra; death. New Orleans Medical Journal, 1884–'85, Vol. I, p. 508.

Fitzgerald, P. G.—Dislocation between last dorsal and first lumbar vertebrae; recovery. Madras Monthly Journal of Medical Science, 1870, Vol. II, p. 271.

Williams, P. O.—Fracture through the arch of the eleventh dorsal vertebra, accompanied with dislocation one inch forward; reduction, partial recovery. Transactions Medical Society, State of New York, 1871, p. 265.

Putnam.—Fracture with displacement backward of a portion of the twelfth dorsal vertebra upon the cord. New York Medical Journal, Vol. XXIV, p. 62.

Bellevue Hospital.—Fracture spinous process seventh cervical vertebra;

partial recovery. Also a case of fracture of seventh dorsal vertebra, with sequel of caries of spine. New York Medical Journal, Vol. XX, p. 500.

Hutchinson, J.—Fracture of a cervical vertebra; death eighteen days after injury. Also a similar case; death sixty hours after injury. Medical Times and Gazette, London.

Rushmore.—Fracture tenth, eleventh, and twelfth dorsal vertebrae; death thirty-nine days after injury. Dr. Sherwell related a similar case, that died six weeks after injury. New York Medical Journal, Vol. XXIII, p. 294.

Mulford, A. E.—A specimen of dislocation of the spine in the cervical region. Glasgow Medical Journal, 1888, Vol. XXIX, p. 247.

Myer, T.—Dislocation of the third, fourth, and fifth cervical vertebrae. St. Louis Medical and Surgical Journal, 1870, New Series, Vol. VII, p. 393.

Milton, J. L.—Dislocation of cervical vertebrae; death; autopsy. Medical Times and Gazette, London, 1852, Vol. IV, p. 188.

Morton, W. J.—Dislocation of fifth cervical vertebra of one week's duration, immobility and distortion of the head and neck, paralysis of arms and legs, inability to swallow; reduction by suspension by the head and rotation of the body. Medical Record, New York, 1879, Vol. XVI, p. 320.

Parrington, W. H. P.—Dislocation sixth cervical vertebra. Medical Times, Philadelphia, 1874, Vol. IV, p. 215.

Reyburn, Robert.—Dislocation fifth cervical vertebra; reduction; autopsy. American Journal Medical Science, Philadelphia, July, 1871, Vol. LXII, p. 110.

Robertson, F.—Dislocation of neck. Western Journal Medicine and Surgery, Louisville, Ky., 1841, Vol. IV, p. 105.

Robertson, R.—Partial dislocation third cervical vertebra. Australian Medical Journal, 1874, Vol. XIX, p. 73.

Russell.—Dislocation seventh cervical vertebra, injury to cord, contracted pupils. Medical Times and Gazette, London, 1870, Vol. II, p. 64.

Ryan, W. M. Dislocation fourth and fifth cervical vertebrae. Pacific Medical and Surgical Journal, San Francisco, 1858, Vol. I, p. 347.

Sanborn, E. K.—Dislocation cervical vertebra. Medical and Surgical Journal, Boston, 1852, Vol. XLV, p. 69.

Schofield, D.—Dislocation cervical vertebra. Clinical Lancet, 1886, N. S., Vol. XVII, p. 675.

Stanley.—Probable fracture, with dislocation of tenth and eleventh dorsal vertebrae; recovery. Medical Circular, London, 1853, Vol. 1, p. 472.

King, A.—Dislocation between the third and fourth cervical vertebrae. Lancet, London, 1842, Vol. I, p. 647.

Fracture lower dorsal and upper lumbar vertebrae; death three days

after. Report Supervising Surgeon-General Marine Hospital, Washington, 1889, p. 407.

Gay.—Dislocation fifth and sixth cervical vertebrae; death in ten days. Boston Medical and Surgical Journal, 1873, Vol. X, p. 275.

Bolles, W. P.—Dislocation fifth and sixth cervical vertebrae. Boston Medical and Surgical Journal, 1873, Vol. X, pp. 349–351.

Bryant, T.—Apparent dislocation of the last dorsal vertebra; partial reduction by extension and local pressure, death eight months after. Transactions Pathological Society, London, 1856, Vol. VII, p. 301.

Steele, J. A.—Dislocation last dorsal vertebra, without fracture; death four weeks after injury; autopsy, destruction of cord at point of injury. St. Louis Clinical Review, 1881, Vol. IV, p. 127.

Hawkins, C.—Dislocation of spine, without fracture, at junction of last dorsal with first lumbar vertebra; reduction, died twenty-fourth day after. Lancet, London, 1858, Vol. II, p. 630.

Gray, L. C.—Successful reduction after four months malposition of a dislocated third cervical vertebra, causing various serious nervous symptoms. Ann. Anatomy and Surgery, Brooklyn, N. Y., 1882, Vol. V, p. 93.

Guerin, J.—Reduction of a dislocation of the second cervical vertebra after seven months. Provincial Medical and Surgical Journal, London, 1840, Vol. I, p. 61.

Hill, B.—Dislocation forwards of the sixth from the seventh cervical vertebra, without fracture; death on twenty-first day. Proceedings Royal Medical and Ch. Society, London, 1867, Vol. V, p. 232.

Holmes, T.—Dislocation of the spine in the dorso-lumbar region. Transactions Pathological Society, London, 1858, Vol. X, p. 219.

Horner.—Luxation cervical vertebrae. Medical Examiner, Philadelphia, 1843, Vol. VI, p. 5.

Hutchinson.—Dislocation of the sixth cervical vertebra. Canada Medical Record, Montreal, 1887, Vol. XVI, p. 125.

Henderson, C. R.—Cervical dislocation. Transactions Mississippi Medical Association, Jackson, 1882, Vol. XV, p. 140.

Herter, A. C.—Cervical dislocation. Journal Nervous and Mental Diseases, New York, 1890, Vol. XVII, pp. 10–17.

Hutton.—Dislocation cervical vertebrae. Dublin Hospital Gazette, 1884, I, New Series, p. 154.

James.—Partial dislocation cervical vertebrae; death on third day. Australian Medical Journal, Melbourne, 1883, p. 360.

Jewett, P. A.—Reduction of partial dislocation of third cervical vertebra. Proceedings Connecticut Medical Society, Hartford, 1877, p. 83.

Jones, T.—Dislocation of spine in upper lumbar region; extension of spine under chloroform; recovery. London Lancet, 1885, p. 338.

King, W. T.—Dislocation of the sixth cervical vertebra; death. Lancet, London, 1848, Vol. II, p. 688.

Lloyd.—Dislocation of the fourth cervical vertebra, and partial fracture; death two and a half days afterwards. Lancet, London, 1857, p. 602.

Longstreth, M.—Dislocation of cervical vertebrae, with injury of spinal cord. Medical Times, Philadelphia, 1878, Vol. VIII, p. 304.

Lucas, T. P.—Dislocation of cervical vertebrae. Australian Medical Gazette, Sydney, 1884, Vol. IV, p. 41.

Makins, G. H.—Dislocation cervical spine. Transactions Pathological Society, London, 1886, Vol. XXXVII, p. 385.

A man in an iron mask.—Dislocation of the neck. Medical Register, Philadelphia, 1888, Vol. IV, p. 263.

Martin, J. B.—Dislocation of neck, caused by falling barn-door; recovery. Proceedings Royal Medical and Ch. Society, London, 1868, Vol. VI, p. 20.

Maxon, E. R.—Dislocation of cervical vertebrae. Buffalo Medical Journal, 1856, Vol. XII, p. 479.

Laplace, E.—Dislocation fifth cervical vertebra, resulting in hemiplegia. Times and Register, Philadelphia, 1889, Vol. XX, p. 582.

Lente, F. D.—Dislocation of fifth cervical vertebra. New York Medical Journal, 1850, p. 284.

Kunkler, G. A.—Case of dislocation of third lumbar vertebra. Lancet and Observer, 1858, Vol. I, p. 212.

Murray, C. H.—Dislocation between the sixth and seventh cervical vertebrae, fracture of transverse process of seventh on left side; death, autopsy; Canada Medical and Surgical Journal, Montreal, 1875, Vol. III, p. 536.

Mutherson, J. J.—Dislocation of spine between ninth and tenth dorsal vertebrae. Peninsular Journal of Medicine, Detroit, 1874, p. 541.

Newman, W. B.—Dislocation cervical vertebrae. London Medical, Surgical, and Pharmaceutical Repository, 1815, Vol. III, p. 107.

Nye, J. M.—Dislocation of fifth cervical vertebra; death in 110 days. Boston Medical and Surgical Journal, 1849, Vol. XL, p. 401.

DISCUSSION.

Dr. Robert Newman, of New York county, said that he had seen several such cases. He then related the history of a case. A man, while endeavouring to pass under a gate at a railroad crossing, was caught by the gate, and sustained a fracture and a dislocation of a dorsal vertebra. He was taken to a hospital, and the treatment adopted was that described in the paper just presented. Ten months after the accident, Dr. Newman, as a member of the consulting staff, was asked to see him. At that time there was paraplegia—some sensation, but no motion—and retention of urine. At his suggestion, the plaster of Paris was removed and

galvanism was applied, with the descending current at the neck and the negative pole at the lower part of the spine. There was a gradual improvement in the action of the sphincters and in the condition of the limbs, and about six months after this treatment was begun the patient could walk with the aid of a cane for over a mile, and eventually almost completely recovered. In another case, a man received a similar injury by falling from a tree. Plaster of Paris was applied, and five days later he died. Dr. Newman said that he only mentioned the case to show that some were hopeless from the first. In regard to the use of electricity, it had been generally admitted (1) that galvanism should not be applied after such an accident until after the subsidence of the acute symptoms, and (2) that after electricity had been used for about six months it was no longer of benefit. He considered this second proposition erroneous, and his object in narrating the first case was to show what beneficial effects electricity was capable of producing even when this mode of treatment was not begun until many months after the injury.

TWO CASES OF FORWARD AND OUTWARD DISLOCATION OF THE ASTRAGALUS, WITH MODE OF REDUCTION AND RESULT.

By Douglas Ayres, M. D., of Montgomery County.

October 29, 1891.

Simple dislocations of the astragalus are not common, and although it may be thrown forward or backward, outward or inward, or obliquely between these directions, still it is the experience of surgeons that a dislocation forward and outward is of most frequent occurrence. When we take into consideration the surroundings of this bone when *in situ*, it being firmly intrenched below the tibia and between either malleolus abutting against the scaphoid in front, and resting firmly on the os calcis,—held as it is to these surroundings by strong ligaments, and guarded by powerful tendons externally,—we realise something of the amount of force required to produce a luxation, and when produced, the difficulties attendant upon its reduction, and the more or less extensive injury to the surrounding parts. It will be of interest, in this connection, to quote the opinions of, first, the older, and then the more modern, writers upon this subject.

Sir Astley Cooper, in his "Lecture upon Surgery,"[1] says,—"From the situation of the astragalus, and its very firm ligamentous connection to the tibia, fibula, calcis, and navicular bone, we could scarcely suppose its displacement possible, and although it is occasionally dislocated, yet the injury very rarely, if ever, occurs without a fracture of one or more of the surrounding bones. When dislocated, it is extremely difficult to reduce, and if this be not effected, lameness to a considerable extent must be the consequence." He says

[1] 1835.

further,—"I attended the following interesting case with Mr. West, of Hammersmith, and Mr. Ireland, of Hart street, Bloomsbury: Mr. Downs fell from his horse on the 24th of July, 1820, and dislocated his astragalus. Mr. West, who first saw him, endeavoured to replace the bone, but could not succeed; he therefore placed the limb in splints, and kept the part moistened with Goulard's lotion. The patient was bled largely, and took some anodyne medicine. On the 25th I visited Mr. Downs with Mr. Ireland and Mr. West, when I found the astragalus displaced forward and inward, accompanied with fracture of the fibula a little above its malleolus. All attempts to reduce it proved ineffectual. The skin over it appeared in a bursting state, so much so that I felt inclined to divide it and remove the astragalus; but, knowing the resources of nature in accommodating parts under injuries and restoring the usefulness of the limb, I declined interfering, and the previous treatment was therefore continued. On the 28th the skin over the bone began to inflame, and, notwithstanding the employment of leeches and evaporating lotions, it sloughed on the 16th of August, exposing the astragalus, which gradually became loosened and dislodged. On October 5, I removed the astragalus, having only to divide some few ligamentous fibres. After this the wound was dressed with soap plaster, and the patient gradually recovered, being able to walk without the aid of a stick."

Samuel Cooper, in his "Dictionary of Surgery,"[1] says,—"A luxation of the astragalus, unattended with a wound in the skin, is a serious and embarrassing accident, for, in general, the reduction is so difficult that it is not many years since the case was deemed a ground for amputation."

Robert Druitt, in his "Principles and Practice of Modern Surgery,"[2] says,—"If these dislocations are simple, reduction should be immediately attempted by extension and the pulleys, and tartar emetic will be needed; although the attempt will often be unsuccessful."

[1] Vol. I, 1836.
[2] Phil., 1847.

William Ferguson, in his "System of Practical Surgery,"[1] says,—"Dislocation of the astragalus, in any direction and under any circumstances, must be looked upon as a very serious injury; for although many instances have been seen where life and limb have been preserved, even under great disadvantages, it must be admitted that such satisfactory results have not always followed the praiseworthy attempts of the surgeon to avoid amputation."

The late Samuel D. Gross, in his "System of Surgery,"[2] says,—"It is obvious that such an accident can occur only in consequence of the application of excessive violence, in which the foot is strongly extended upon the leg and more or less rotated upon its axis. Hence it is always of a grave nature, and rarely unaccompanied by fracture of the inferior extremity of the tibia and fibula, which thus adds still further to its complications and dangers. Even when the displacement is only partial, the difficulty will generally be very great, though not as much so as in the complete form, where it is usually insurmountable."

The late Frank H. Hamilton, in his "Practical Treatise on Fractures and Dislocations,"[3] says,—"It will be readily understood that nothing short of very great violence could disturb and completely break up the connections of a bone so compactly and firmly seated as is the astragalus, and that, aside from any unusual complications, under the most favourable circumstances intense inflammation must naturally be anticipated; and, with few exceptions, this has actually taken place. Even when reduction has been promptly and easily effected, inflammation, gangrene, and death have sometimes speedily ensued. But more often the reduction has been found to be exceedingly difficult or impossible, and complete removal of the bone or amputation has been immediately demanded. In a limited number of cases, on the other hand, the bone has been easily reduced, and recovery has taken place with a tolerably useful limb, or resection has been

[1] Phil., 1848.
[2] Phil., 1862.
[3] Phil., 1875.

practised with an equally favourable result. In still other cases the bone has been left protruding, and the patient has finally recovered so far as to be able to walk again, but in such a crippled condition as to render the achievement a very doubtful triumph of conservative surgery."

John A. Wyeth, in his "Text-Book on Surgery,"[1] says, —"Luxation of the astragalus is a serious accident. The efforts at reduction do not always succeed, and even when reduction is effected, the injury to the joint may be such that loss of function results."

These quotations clearly indicate the consensus of opinion of the older as well as the more recent writers upon this subject, not only as to the difficulties attendant upon its reduction, but the results as to the impairment of the functions of the joint; and although my experience with this luxation has been limited to two cases, extending over a period of twenty-six years of active practice, I report them, with mode of reduction and results, both because they are uncommon, and because some slight departure from the ordinary course suggested by writers enabled me to reduce them by manipulation, and, fortunately, to obtain good results. Before taking into consideration the cases in detail, we will consider the peculiar conformation of this bone. About two thirds of its upper surface is convex from before backwards, and slightly concave from side to side; it is slightly broader just under the anterior articulating surface of the tibia than at the posterior. It has two articulating surfaces, separated by a deep groove on its under surface, which is convex. It has an anterior projection, or neck, beginning at the termination of its superior articulating surface. Of the two articular facets on its inferior surface, the posterior is the larger, oblong, and concave from side to side; the anterior about equal in length, narrower, oval in form, and convex longitudinally. The general form of this bone posteriorly is somewhat wedge-like, from the arrangement of its facets, and when dislocated forward and outward this peculiar con-

[1] N. Y., 1891.

formation may be utilised in its reduction, for if we can extend and adduct sufficiently to move it from its outward position, and cause it to engage under the tibia, and hold our vantage-ground as we force it backward until the point of its greatest superior convexity has passed the anterior tibial edge, then the work is nearly accomplished.

Case I. On the 19th day of October, 1884, I was called to the residence of one of our townsmen, Mr. A. G. B., aged 66 years, of stout build, whom I found lying upon his bed, where he had been placed one half hour before. Mrs. B. gave me the following history: He had been at work at his front door removing an awning, for which purpose he was using a high step-ladder which he had placed upon the first step, or platform, from the door. When nearly at the top, and while reaching forward to remove the fastenings, he suddenly slipped and fell, striking upon the edge of the platform, and from thence to the ground. Finding that he could not walk, she summoned assistance, and they carried him in and placed him where I found him.

I discovered, upon examination, great prominence over the left instep. Upon the outer side, and in front of the lower portion of the fibula, the foot was forcibly extended and turned inward, and was quite immovable; the tendons and skin were tense, and a marked depression existed just under the lower tibial edge. I could discover no evidence of fracture of either malleolus. The symptoms pointed plainly to dislocation of the astragalus, forward and outward. I sent immediately for my father, the late Dr. Alexander Ayres, for consultation, who, upon examination, verified my diagnosis. The patient was immediately placed under the influence of an anaesthetic; and when satisfied of its complete effect, the attempt was made at reduction. The leg was flexed; and while one assistant made extension at the foot with adduction, and another, counter-extension at the lower part of the thigh, I endeavoured to dislodge the bone from its position by pressing it forward and inward toward the joint, but found it quite firm in its position. After directing my assistant for a time as to the direction in which to use force, without material advantage as to reduction, I determined to make the extension myself, and thereby be enabled to graduate it as the case might require. I placed myself between the limbs of the patient, flexed the leg over the upper part of my left thigh, assisting somewhat in the counter-extension by holding it firmly against my body with the left arm, grasping the instep with the right and the heel with the left hand. I made quite forcible extension and adduction of the foot, at the same time endeavouring to press the bone forward and inward. It gradually yielded; and as it did so I found that I had better control of the foot as to forward and back-

ward movement, and I was soon enabled to engage it under the anterior tibial edge, from which point, by using the foot as a lever, and holding the advantage gained with the inner side of the right hand (of which I will speak more particularly in the report of the next case), it soon glided into position.

The after-treatment consisted of fomentations thoroughly and constantly applied until the inflammatory action had subsided, tenderness was greatly relieved, and swelling abated, and later, showering with cold water, with light, brisk rubbing, and the institution of passive motion at the end of the second week. He began to use the foot at or about the seventh week, and was able to walk out upon the street, with the aid of a cane, at the ninth. The recovery of the motions of the foot seems to have been complete; and only a short time ago he informed me that he could discover no difference in that respect.

Case II. On the 9th day of July, 1888, Mr. H. C. S., aet. about 35 years, of well knit and muscular build, was brought to my office. He gave me the following history of his case: He lived in an adjoining county, and was riding upon a load of hay in the early part of the day. While passing a portion of the road, where one side was lower than the other, his load was overturned, and he was thrown violently to the ground, striking upon his right foot. Upon attempting to rise, he found that he could not use the foot, when a companion summoned assistance, and he was taken in a carriage to the nearest village, about two miles distant. The physician called upon pronounced it a dislocation of the astragalus, and made several attempts to reduce it, without success. He called a neighbouring physician in consultation, who advised more forcible extension; and, not having pulleys, a band was fastened about the foot, in which a lever was used as the extending power. The patient having been placed upon a platform near at hand, the edge of which was utilised as a fulcrum, several assistants making counter-extension from the shoulders and thigh and not succeeding in accomplishing the reduction, they advised him to come to me.

When he arrived some hours later, I think about the middle of the afternoon, I found upon examination the right foot turned inward, and quite immovable, with much swelling, redness of the surface, heat, and tenderness. There was a hard projection on the outer part of the foot, in about the same relative position as in the former case, with evident shortening of the limb, but no evidence of fracture. I found the parts so much swollen and so immovable that I was led to doubt somewhat the success of an attempt at reduction. I informed the patient of the gravity of the case, and obtained his consent to the resection of the bone should my attempt at reduction prove unsuccessful. He was placed upon an ordinary operating chair, with a detached foot-rest of about the same height as the chair, upon which the limbs rested. My assistant

gave the anaesthetic (pure chloroform); and when satisfied that the patient was fully under its influence the attempt at reduction was begun. I seated myself upon the stool, between his limbs, flexing the leg over the upper part of my right thigh, holding it firmly against the body with my right arm, grasping the instep immediately in front of the projecting bone with my left and the heel with my right hand. While an assistant made counter-extension at the lower part of the thigh, I made forcible extension and adduction, at the same time endeavouring, as in the former case, to press the bone forward and inward. It did not yield readily, but by persistent effort I at last felt a movement, and was enabled to engage it under the tibia, when, following the advantage gained, with the inner side of the left hand, and steadying with the thumb of the right, I made use of the foot as a lever, prying the bone gradually backward until the point of the greatest convexity of its superior facet had passed the anterior tibial edge, when, to my great satisfaction, it glided into its normal position. I directed the same after-treatment as in the first case, fomentations, etc., and did not see the patient again in three or four months, when he informed me that he began to step upon the foot in about one month after the accident. I found all the motions of the joint quite perfect.

I would say, in conclusion, that I do not believe it possible to formulate an exact course of procedure applicable to all cases of luxation of this bone, owing to the various complications which may arise; but in this particular form, and in these two apparently typical cases, it would seem that the prominent factors in producing the desired result were three in number:

1. Complete anaesthesia, insuring the most perfect relaxation of the parts.

2. Taking advantage of the best position to make extension and graduate the force required.

3. The utilisation of the foot in making the application of a simple mechanical principle, to produce the desired result.

DISCUSSION.

Dr. J. W. S. Gouley, of New York county, said that as the reader of the paper had lucidly described the anatomical points connected with the astragalus, he would pass over this part of the subject, and simply present a cast showing forward and outward luxation of the astragalus. This cast was taken from a man who only a few hours before had fallen from a height upon his foot. A duplicate of this cast was sent to Dr. Norris of the army, and was referred to by him in his excellent paper on this subject. It will be noticed that the cast shows admirably the prominence of the head of the astragalus upon the instep. It illustrates

about as complete a luxation of the astragalus as occurs in this direction.

The patient he was about to present was injured on September 28, and was brought to the hospital a few hours afterwards. The foot was completely at right angles to the leg so that the sole looked forward the opposite side. The luxation of the astragalus was at once recognised, but from the position of the foot, and the enormous amount of swelling, the speaker found it difficult to believe that there was no fracture. However, on reduction of the dislocation, no fracture was found. The mode of reduction in this case, as in other cases which had come under his observation, was principally by manipulation, performed by the surgeon with his own hands, and with the exercise of little force. The patient, whom he now presented, when taken to the hospital was at once placed under chloroform, and without undue force, by flexion, extension, and slight rotation, reduction was soon effected. The leg was then enveloped in cotton and a snug bandage applied, with an outer wooden splint.

After about one week this dressing was exchanged for an immovable gypsum apparatus; the latter was kept on for eighteen days, and when removed, six days ago, the patient was able to walk as he now does. [Patient exhibited.]

Dr. Gouley said that he was very much surprised at the slight force necessary to effect this reduction. Excessive force applied by means of pulleys or similar appliances is much more likely to do harm than good. In two cases of subluxation which he had seen, reduction of the dislocation was impossible.

Doctor Gouley then exhibited photographs of a case that had required excision of the astragalus, and presented an analytical summary of seven cases in all, that had come under his observation, as follows:

Of these seven cases, four were successfully reduced, two were unreduced, and one required excision. In the four dislocations that were reduced, the dislocated astragalus projected forward and outward, causing great tension of the integuments and inversion of the foot to the extent that the sole of the disabled foot looked toward the opposite foot. There was in these cases more or less swelling due principally to blood extravasation. Reduction by manipulation in each case was effected a few hours after the injury. Two of the four patients were able to use the foot moderately within five weeks; one patient made a longer convalescence, owing partly to fracture of both malleoli, and one patient was disabled three months from paresis of the peroneal muscles due to a contusion of the peroneal nerve, but the foot was apparently sound in five weeks though there was a fracture of the external malleolus. All four patients ultimately recovered the normal use of the injured parts.

After reduction, a temporary dressing and wooden splint were applied to each case; and on the subsidence of the swelling, this dressing was

replaced by an immovable gypsum apparatus, which was retained four weeks in three cases, and eighteen days in one case.

In two cases, which were seemingly subluxations forward and outward, the deformity was less marked than in the four cases to which reference has been made, and reduction was not possible. One of these two cases was a subluxation forward and outward of the left astragalus, complicated with fracture of the thigh and of both bones of the leg low down on the side of the injured foot. The other case, a subluxation forward and outward of the right astragalus, seen in consultation with Dr. Stephen Smith, was complicated with fracture of both thighs, of the left leg, of the left patella, and of other bones, amounting to eight fractures in all, due to a fall from a great height. Both patients recovered, with equino-varus deformity.

In one case, the dislocation became compound from sloughing of the soft parts, the left astragalus projecting forward and inward, and the external malleolus being fractured. On the day of the accident unsuccessful attempts had been made to reduce the dislocation. The astragalus was finally extracted, and the patient made a good recovery after a long convalescence. It was nearly five months before the parts were completely cicatrised, and six months before he could walk. He was seen more than three years after his discharge from Bellevue hospital. He then had good use of his foot, and could walk well without discomfort.

In Dr. Norris's paper on dislocation of the astragalus, published in the "Transactions of the American Surgical Association" for the year 1883, and in the discussion which followed its presentation, there are, in addition to my own cases, eleven well authenticated successful reductions of simple dislocation of the astragalus. If to these be added one case by Dr. Charles Phelps, the two cases of Dr. Ayres, and my four cases, the total will be eighteen cases. It seems that this experience should, in every case of such dislocation, warrant an attempt at reduction, which some writers regard as futile. I believe failure of reduction to be owing largely to the exertion of undue force. In four of my seven cases the reduction was effected with a minimum of force, counter-extension being made from the leg by an assistant, who firmly steadied it with his hands, while moderate extension, with alternate flexion, extension, and eversion, is made of the foot, one hand grasping the heel, the other the instep, the patient being under anaesthetic influence. In each case reduction was complete in the course of five minutes.

Respecting irreducible dislocations of the astragalus, much has been said for and against excision of the displaced bone. In the two cases that I have observed, it would not have been wise to perform excision,—in one case, owing to the unfavourable condition of the patient; in the other, owing to the many fractures which complicated this dislocation.

Both patients subsequently had fair use of the injured foot. In cases that become compound from sloughing of the soft parts, secondary excision is often clearly indicated, and gives good results.

In the "Dictionnaire Enclyclopédique des Sciences Médicales," Volume VII, page 14, is an interesting statistical summary of luxations of the astragalus, by Dr. Léon Labbé, in which he records the experiences of Broca, Dubreuil, and others. He cites twenty-five cases of extraction of the astragalus for irreducible dislocations, collected by Broca. Of these cases, twenty-four were cured, and one required amputation of the leg, and the patient recovered. He mentions five additional cases, which he credits to Heyfelder, Fournier, and Jarjavay, and further gives an account of eighty-seven cases of compound dislocation of the astragalus, collected principally by Broca. Of these eighty-seven cases, sixty-one recovered and twenty-six died.

Dr. E. M. Moore, of Monroe county, reported a case which had been brought to him after it had baffled a number of physicians. Placing a clove-hitch around the instep, he made very violent efforts at reduction, but all to no purpose. Afterwards, by gentle manipulation, he was able to effect the reduction; and he, therefore, wished to add his testimony to the superiority of gentle manipulation over very forcible efforts at reduction. In another case which he had seen during the past year, he adopted the method of gentle manipulation at the very outset, and was agreeably surprised at the ease with which the parts were restored to their normal position.

The previous speakers had omitted to state in what position the splint was applied after reduction,—whether it was carefully applied at right angles, or allowed to take the position nature always does, with the foot bent forward, owing to the action of the tendo Achillis. He thought it was very important that the splint be applied at right angles, for not only does this place the parts in the best possible position in the event of a possible anchylosis, but as there is a tendency on the part of the bone, after it has been reduced, to pitch forward a little, this interferes with the process of extension.

Dr. Nicholas Senn, of Chicago, said that if cases of fracture of the ankle joint, complicated by dislocation of the astragalus forward and outward, were excluded, his experience had been quite limited. Under such circumstances reduction was quite easy. The after-treatment was very important, for if not carefully attended to, there was apt to be an equino-varus position with imperfect function. In an old case of dislocation forward and outward, uncomplicated by fracture, where no attempts had been made at reduction, probably because the injury had at first been considered a sprain, the man had fair use of the limb, and could walk

with the aid of a cane. Of course no attempts were made at reduction by him, and the patient would not consent to a resection.

The PRESIDENT said, in regard to the case alluded to by Dr. Gouley, of the lady with so many fractures, that the bone still remained dislocated after a period of three years, but she walked very well with the help of a cane, and fairly, even, without such aid.

Dr. AYRES, in closing the discussion, said that he had omitted in his paper to make any special reference to the after-treatment. He put the patient to bed, and at first usually ordered fomentations. Afterwards, a splint was applied at right angles, and at the end of two weeks it was removed and passive motion begun. Both of his cases were so treated.

LARVAE OF DIPTERAE FROM THE HUMAN INTESTINES.

By H. O. Jewett, M. D., of Cortland County.

October 29, 1891.

My attention was called about twelve months ago to the larvae which form the subject of this paper. They were brought to Dr. Caleb Green and myself at nearly the same time, by two different patients, living not far from three miles apart, one a man of thirty years, the other a young school-girl, both intelligent, reliable persons, who, not doubting that they had discharged these from the bowels, were at first somewhat alarmed.

The larvae, of which we had seven or eight in all, were of different sizes, varying from seven to fifteen lines in length, resembling in form, but larger, more elongated, and somewhat more tapering at the extremities, the larvae of the common bot or gadfly. They appeared to be entire, without distinct marks of segmentation, having rudimentary feet or prolegs, and a tail the size of an ordinary knitting needle, nicely tapered, and somewhat longer than the body. Those brought to us immediately after they were supposed to have been voided were very active, and of a pearly white, very soon changing to a dark mud colour on exposure to the light and air.

The first and largest specimen, measuring 1¼ inches in length, was brought to me by the man, a carriage-painter and repairer by trade, quite fond of, and considerably accustomed to, the care and management of horses. This man lives in a new house, situated upon dry, gravelly soil, in a newly built up part of the town, with clean, wholesome surroundings. He is a man of correct habits, ordinarily cleanly in his person, a good liver, and obtains his water for drinking

and culinary purposes from a driven well with twenty-five feet of pipe,—such a well as is in common use on our flat lands, affording pure water if not in too close proximity to marshes or cesspools.

This patient has usually enjoyed fair, though not robust, health, but had for several weeks complained of a capricious appetite, with some irregularity of the bowels, attended with severe spasmodic gastric and abdominal pains, and frequent but transient nausea. Believing, as many others do, that he had worms, he sometimes fancied he could feel them crawling in the lower bowels. For these symptoms he had occasionally taken a vermifuge composed of some mercurial with a few grains of santonine, with apparently no other result than the cathartic effect.

While at stool one afternoon, feeling an unusual sensation about the anus, he turned to examine his evacuation, and discovered the larva partly imbedded in the newly discharged faeces. Taking it out and washing it, he put it in a small phial and brought it to my office. On the following day I took it to Dr. Green for examination, and found that the doctor had just received one from the young lady. The history of this last was as follows:

Dr. Green had treated the girl from time to time for severe attacks of spasmodic gastralgia, with frequent colicky pains in the lower part of the abdomen, and some vague nervous symptoms. The mother, believing that the girl was "troubled with worms," administered to her, in the course of a day, three doses of what was called "Kickapoo Indian Worm Medicine," a nostrum containing some cathartic properties.

The next morning, before going to school, the girl had two evacuations from the bowels, using a clean white earthen vessel in her room. After defaecating, curious to observe the effect of her vermifuge taken the day before, she examined her stool, saw the larva, and reported to her mother, who went at once to the vessel and inspected its contents, finding the worm squirming about as if annoyed by the urine present with the faeces. She was struck with its peculiar appear-

ance, its activity, and more especially with the tail, as she expressed it, "like that of a mouse." Naturally anxious about the condition of her daughter, she put the worm in a small tin box, and sent the girl directly to Dr. Green with it.

We compared our specimens, found them identical, and our first impressions were that they were solitary, accidental entozoa—not such from preference, but by chance. But, upon subsequent search several more were found among the ordure in a commode or closet used by the girl and some other members of the family. These last were of a dark brown colour, and more sluggish and inactive than the first.

This family, like the other, live in a healthy locality in the suburbs of the town. They are remarkably neat and tidy about their house and household affairs, are good wholesome livers, and obtain their water from a driven well more than thirty-five feet deep, through a loose, gravelly soil, and probably through a stratum of clay some feet below the surface. These wells, unlike the old-fashioned dug wells, admit no surface drainage, and afford, so far as known, pure water at all times. Thus it will be seen that there is nothing apparent in the surroundings, the habits, or the diet of these families to account for their being infested with these parasites.

The above mentioned include all of this species of larvae which we have seen or heard of in this or any other community, and it is obvious that they must be exceedingly rare to have so long eluded the general observation of, and received so little attention from, expert entomologists.

Of course we saw none of them emerge from the anus, nor could we be expected to furnish such positive testimony. Neither could our patients have seen them discharged, but they aver that they felt them, and found them involved in the freshly voided faeces. Had these all been brought to us by a hysterical girl, without corroborative testimony, we might have had some reason to suspect it as the outcome of one of those freaks so common to that class of patients; but even then they would have been a curiosity, leaving us to wonder

how she could have obtained them in their obviously fresh condition.

But to summarise the evidence, myself vouching for the credibility of the witnesses: We have an adult man and a young girl, living miles apart, strangers to each other, neither one cognisant of the experience of the other, yet they come to us, at about the same time, with separate accounts of a corresponding experience. There was no chance for collusion, and no good cause to distrust the sincerity of our patients. It is scarcely possible that the man could have been mistaken, when, prompted by his sensations, he turned immediately to his stool and saw the larva in the condition which he describes. Nor is it at all probable that the young lady would have failed to see the worm by daylight in the white vessel before using it, or that it could have found its way there unobserved during defaecation except by being voided with the stool.

I had noticed that while these creatures moved about in a lively manner in fluid or semi-fluid substance, they could make very little headway upon a smooth, solid surface. Hence, they could not have climbed the outside of the vessel, nor could they have reached any point above so as to have fallen into it.

But circumstantial evidence is sometimes better than direct testimony. We have the previous condition of our patients, as observed by Dr. Green and myself,—their subjective symptoms justifying a diagnosis of verminous irritation; the appearance of the parasites soon after the administration of well known anthelmintics; and we have the additional fact that those patients have since remained entirely free from the harassing symptoms complained of before.

It will also be remembered that those of the larvae shown to us immediately after they were believed to have been voided, were of a pure white, implying some internal origin, whereas, had they developed in any outside situation, they should have been of a dark colour, as they soon became on exposure to the air, and as were those found at a later period.

That these are, indeed, true entozoa, either from preference or by chance, and having been expelled like other entozoa, are afterwards discovered in faeces, or that they have a chosen habitat among, and a special affinity for, human excrement, must be apparent.

I have been thus particular in detailing all these facts as they were presented to us, in order that others may form their conclusions independent of any convictions of our own as to the nature, origin, and source of these curious larvae.

I sent several of our specimens by mail to Dr. A. L. Carroll, of this city, and am indebted to his researches for the identification of them as the "rat-tailed larvae" of a rare dipterae, which, though not hitherto unknown, have received very little attention from scholars and writers upon the subject. According to the doctor's authority, the tail, which is a distinguishing characteristic, is a respiratory organ, disappearing like that of the mosquito, in the pupa state, and giving place to quasi horns.

Whence these things come, and how they are introduced, are as yet matters of conjecture. But, the ova once ingested, the vitality of the embryos will resist digestion, and though they have no hooks by which to attach themselves to the mucous membrane like bots, they may be able to retain their occupancy of the alimentary canal, for a season at least, during their larval growth. Though it is not to be supposed that in this stage they can multiply by propagation, or maintain their tenancy beyond a definite and limited period, they are by no means desirable even as temporary guests.

A few instances have been reported of the presence of bots in the stomachs of grooms. Also of the gadfiy, oestrus bovis and oestrus ovis, respectively, beneath the skin, and in the frontal sinuses of man. But I am aware of no previous record of the rat-tailed larvae in the human intestines.

Questions of importance in a sanitary as well as in a scientific point of view are,—To what particular species do these belong? What is their most natural habitat? And where

does the insect deposit her ova? Are they habitual, or merely accidental, parasites?

Other questions of equal importance to the physician are, —How do they reach the human stomach? If in food or drink, what food or drink is responsible for their introduction?

Their extreme activity in all probability rendering them more offensive and annoying to the patient than ordinary intestinal worms, how much mischief may they accomplish by their presence as entozoa?

What sanitary and dietetic precautions will prevent them, and what therapeutic means will most effectually arrest or dislodge them?

But, whatever may be their origin, whether they be harmless, earth-born denizens of the outer world, or unwelcome tenants of our interior, they are certainly of sufficient importance to invite the careful attention of physicians and naturalists.

DISCUSSION.

Dr. A. L. Carroll, of New York county, said that the communication just presented was of great interest, not only to the physician, but to the entomologist. Very little could be found in medical literature concerning the pseudo-parasites. At the time he first examined the specimens sent to him by Dr. Jewett, he was not aware that any previous case of this kind had been reported. With the aid of Mr. Bentenmüller, the entomologist of the American Museum of Natural History, it was determined that the specimens were larvae of dipterous flies, only three or four species of which possess the "rat tail" which characterises the specimens under consideration. Finally, it was narrowed down to one of two species, viz., merodon, or eristalis. The larvae of both these species are very similar. In both they are aquatic, the fly depositing its ova usually on living vegetation, by preference near the margin of streams and pools of water. The larvae pass through their preliminary stage very rapidly into the pupa stage, when they burrow, and eventually emerge as the perfect insects.

Upon careful search into the literature of the subject, Dr. Carroll found that two previous cases had been reported, in which the larvae of eristalis were found in the human intestine. Some years ago, a paper by Professor Say, read before the Philadelphia Academy of Sciences, described two

cases, one of an adult man, and the other of a girl, in which the larvae, supposed to be those of eristalis, were passed from the bowel. Dr. J. W. Compton, of Evansville, Ind., reported an instance of rat-tailed larvae being voided from the bowel of a young woman, and about the same time Dr. J. Lintner, our state entomologist, received from a physician several larvae which were said to have been passed from the bowel of a man. The specimens from Dr. Compton's case were forwarded to the editors of "Insect Life."[1] The larvae in both cases were supposed to be those of eristalis. Then came the two cases just reported by Dr. Jewett, one an adult man, and the other a young girl.

The larvae of the ordinary flesh fly have been reported in two or three cases. In one instance, at a meeting of this Association three years ago, a case in Brooklyn was reported, in which a hand-fed child had passed a number of larvae which were considered to be those of the "flesh fly." In 1890, Dr. F. W. Higgins, of Cortland county, wrote of larvae, to the number of hundreds, being vomited by a child of eighteen months.[2] One doubtful case of "bots" was reported by Dr. J. J. Knott in the "Louisville Medical News."[3] It was probably not the "horse bot." The bovine oestrus deposits its ova under the skin; the "sheep bot" deposits its ova in the nostrils of the animal. Three or four cases have been observed and reported in the human subject, occurring among sheep tenders. It has been supposed that during sleep the ova have found their way into the nostrils of these sheep tenders. These have developed in the frontal sinus or in the antrum.[4]

We owe a debt of gratitude to Dr. Jewett for bringing this matter before a strictly medical society, for almost all that is known upon the subject has been confined to the purely scientific literature outside of medicine, and very few in the profession know of the extent to which these pseudo-parasites actually exist.

The only way that the place of these rat-tailed larvae in natural history can be positively determined is by hatching them out. Dr. Carroll suggested that if any of the members should meet with these larvae, they might place them in perforated boxes with a little earth, and forward them to him for examination.

The case just reported by Dr. Jewett, the speaker said, had been the best observed and the best reported case on record. It has been supposed that these larvae may be transferred to the human stomach, either

[1] Vol. II, pp. 261, 262.

[2] Annual of the Universal Medical Sciences, 1890, Vol. I, p. 23.

[3] 1877.

[4] A translation with annotations from the French of Jacobs, by T. S. Cobbold, on Oestridean and Muscidean larvae in the human body, appeared in the London Veterinarian for 1883. The most recent summary of the literature of the pseudo-parasites, by Dr. Hugo Summa, is to be found in the St. Louis Medical and Surgical Journal, April, May, and June, 1889.

by drinking-water (for they have been found in wells), or by the ingestion of uncooked vegetables, such as salads.

Dr. JEWETT, in closing the discussion, said that he noticed the specimens had shrunken greatly; when in the fresh state, they measured over one inch. He had been struck with the great disparity between the larvae and the perfect insect. The larvae brought to him, although kept in a vial without spirits and without much air, were quite lively for fully twenty-four hours. Although diligent search had been made for the pupae in their natural haunts—decaying wood about a wood-pile, and in the droppings of stables—no specimens could be found.

REPORT OF AN UNUSUAL CASE. WAS THE DIAGNOSIS CORRECT?

By Simeon Tucker Clark, M. D., of Niagara County.

October 29, 1891.

When the case which I am about to describe began to amend, and ultimate recovery seemed almost assured, I was many times reminded of a story Prof. E. K. Sanborn often related to his classes at Castleton, Vt.

When he was interne at the Hôtel-Dieu, and very soon after his admission, at the close of a brilliant clinic the patient was given into his care. He laboured most assiduously for his recovery, hoping, as he said, to establish himself in the good graces of his teacher. On the fourth day, he was not a little elated at a visit from the professor, and was quite sure he would be complimented, at least on his good nursing, for the prospect of recovery seemed to the young man exceedingly promising. It must have seemed so to the great Frenchman, but it produced a quite different effect, for no sooner did he observe the improvement, than raising his gold-headed cane above the young man's head, he exclaimed,—"*Sacre Americain! vous avez guéri mon malade, vous m'avez perdu l'occasion de verifier ma diagnose splendide, et de la science vous avez volé une autopsie.*"[1]

Fortunately for my patient, his complete recovery has prevented an autopsy, and the "Sacre Americain" who treated the case is by no means certain that the remedies exhibited contributed to the fortunate result; but of one thing he is well assured, that without his constant watchful care and unceasing encouragement, he would not now be in doubt concerning his diagnosis.

[1] You damned Yankee! you have cured my patient, and have lost me an opportunity to verify my splendid diagnosis, and stolen from science a post-mortem examination.

The Case. G. W. W., aet. 52, weight 145 lbs., height 5 ft. 5 in., by occupation a druggist and plate-glass contractor, married, and never sick. On June 19, while assisting three other men to unload a box of plate-glass weighing 1,000 pounds, he suddenly felt a sharp pain at the end of the ensiform cartilage. He did not lose his hold on the box, and succeeded in transferring it from the car to the cart. The first spasm of pain was transient, but was followed by nausea and pallor. He was able, however, to walk from the railroad depot to his store, at least a half mile. At the store he drank a glass of brandy, with marked improvement. His dinner hour having passed, he walked to the Grand hotel, and, as he expressed it, was "more than hungry." He ate freely and rather rapidly, and on arising from the table a second spasm of pain occurred, immediately followed by emesis, profuse diaphoresis, and such marked prostration that bystanders believed him dying.

He was carried, at his own request, to his store rather than to his residence, and was immediately seen by Dr. John Foote, an experienced and careful physician, who watched the case from 2 p. m. until after midnight, at which time he requested that I should be called in consultation. On my arrival, the doctor said,—"When I was called I did not believe George would live half an hour. He was almost pulseless; drops of cold sweat covered his brow, and restlessness was extreme. He suffered a burning pain in the epigastrium, and his respiration was difficult. I have given brandy and morphia liberally, but no reaction has followed, and you will find the patient in much the same condition at the present time."

On entering the room of Mr. W., I found that the description given me by Dr. Foote covered the present conditions; I also learned that the brandy and morphia had been rejected as soon as taken, and, as the restlessness seemed increasing, with the doctor's approbation I administered hypodermically one fourth grain of sulphate of morphia, and one one-hundred-fiftieth of atropia. The restlessness was soon quieted, and the patient slept, but the pallor and prostration continued, and the general appearance of the case was very unfavourable. From this time I was associated with Dr. Foote in the case. Reaction was not established until the next day, after the repetition of several enemata of brandy and milk and morphia and atropia hypodermically, at 4 a. m. and 12 m. of June 20. From this time until the 24th the patient improved, but seemed feeble, and did not regain his colour. He was kept in the recumbent position, and allowed only fluid nourishment. He took one hypodermic injection of morphia at night; no other medication. On the afternoon of the 24th he was dressed and sat at table, and on his own responsibility ate heartily. Soon after, there occurred an attack of vomiting, much more violent than that of the 19th, with excruciating pain at the end of the ensiform cartilage, and complete prostration.

Neither Dr. Foote nor myself happened to be in the city, and a num-

ber of physicians were called by different friends. Two opinions were advanced;—one considered it a case of acute indigestion, the other pronounced Mr. W. suffering from angina pectoris; but all agreed that a hypodermic of morphia was indicated.

When Dr. Foote arrived—and I was but a few minutes behind him—we found the same conditions as on the 20th, but aggravated. The next morning, in addition to the great acceleration and feebleness of the pulse, we found a most unnatural perturbation. The heart's action was correspondingly abnormal. The apex impulse was wanting, as was also the first or systolic sound. The diastolic sound had become a succession of indescribable murmurs, intermittent, and of varying rhythm. All of the many physicians who examined the patient at this time pronounced this a most unusual and dangerous condition of the circulation. Percussion showed an increase of dulness over the heart-region, and auscultation, as well as percussion, revealed deflection of the heart of one and one half inches to the left of normal. Posteriorly no sounds of the heart could be heard, and the lower lobe of the left lung was emphysematous. From the 25th to the 30th Mr. W continued much the same. He had no pain, but complained of great prostration and a sense of weight in the praecordia. He was nourished by enemata—milk, eggs, beef, and brandy, *pro re nata*. For medicine, digitalis, strophanthus, nitro-glycerine, strychnine, and morphine were given, but I am not sure that we might not have done as well without them, excepting the morphia.

July 1, some time in the night, he felt what he described as "a giving way in the breast." "It was," he said, "by two distinct motions, and after the second I felt my heart beating against my ribs." The next morning Dr. Foote and myself were delighted to find a normal but still feeble pulse,—the heart in its proper position, and giving, with the exception of a slight pericardial murmur, perfectly healthy sounds. From this date, July 2, he continued to improve. We began feeding by the stomach very gradually, and allowed no solid food for ten days. After July 15 he was permitted to assume the sitting posture for a part of the time. July 20 he walked out, and on the 25th professional attendance on him ceased. He is to-day, October 25, fully recovered, and has nothing to remind him of his severe illness.

Diagnosis.—Rupture of the diaphragm at the anterior, superior dependent angle of the oesophageal orifice, with consequent laceration of that branch of the phrenic artery which passes through the diaphragm at that point, and disturbance of the accompanying phrenic nerves.

Resultant pathological conditions.—It will be observed from the history of the case, that at the time of the accident

the sudden pain in the xiphoid appendix, or referred to that point, was of short duration, although followed by pallor and prostration. We believe at this time a small clot was formed, with temporary amelioration of the symptoms. Two hours after, when the stomach was fully distended with food, and the cervical portion of the oesophagus dilated by the disengaged gases, the lacerated surfaces were more fully separated, inducing a corresponding augmentation of pallor, nausea, and diaphoresis, evincing a large increase of haemorrhage. On the night of the 24th of June, under almost the same circumstances, the same symptoms were repeated with increased severity. On the morning of the 25th, the accumulated clots were so considerable as to fill the inferior portion of the middle mediastinum, and to crowd the heart one and one half inches to the left, this deflection being due to the anatomical fact that the diaphragm is three fourths of an inch lower on the left than on the right side. The accumulated blood not only changed the position of the heart, but fettered or quite prevented its apex impulse. During the night of July 1st, or morning of the 2d, these clots had become so far absorbed as to release the organ from its malposition, and to allow it to give forth its normal sounds. The slight pericardial friction murmur was evidence of partial organisation of the clot at the apex, and the beginning of an adhesion at that point. Was this diagnosis correct?[1]

[1] Drs. Cronyn of Buffalo and Marcy of Boston concurred in the diagnosis.

SUBJECTS OF INTEREST.

By John Cronyn, M. D., of Erie County.

October 29, 1891.

Mr. President and Fellows: "This is an age of promise and of fact;" of promise in scientific investigation, and experiment on many lines to make apparent the fact. In no direction is this more evident than in the effort to solve the mysteries of life and death. Were it as satisfactory in fact as it is in promise, what a boon to the human family it would be! The vast advances that are of daily record in cerebral surgery, and the physiological laws that experiment has taught to elucidate pathological states, have suggested the report of the following case:

Master B., at fourteen, a bright, intelligent boy, able to read, write, and cipher, was, with the servant man, examining a new pistol, which while in the servant's hand and playfully raised to the boy's head "went off," sending a bullet into the head of the youth. It entered the left orbital plate of the frontal bone at about its centre, passing through the brain on the plane of its entrance, with slight convergence toward the mesial line, four and one half inches. The boy fell as if dead: a neighbouring physician pronounced him so. The accident happening in the evening, it was late at night when I saw the patient. A careful examination discovered a faint, slow respiratory effort, with slow and scarcely perceptible cardiac action, no pulse at the wrist, wound discharging blood and brain substance, whole body cold and the superficial vessels much congested, pupils dilated and insensible. An ordinary probe passed carefully into the wound came in contact with the bullet, producing a decided "click," and evidently at the same time moving it further backwards. A twitching of the limbs set in, lasting a few minutes, and then more evident efforts at respiration and cardiac action were manifest. This condition suggested the propriety of resorting to some surgical means which might bring about results the opposite of primary evidences. The lad was wrapped in warm blankets, his head shaved, and a little dry lint applied over wound with bandage. He was put to bed

and directions left for the local physician that if violent reaction should set in ice should be applied to the head and a drop of croton oil put upon the tongue, with a free bleeding from the arm if needed; nourishment by enema. No reaction took place beyond a gradual restoration of all the functions of secretion and excretion, and restored consciousness on the third day. His right side, arm, and leg were paralysed; he was unable to speak, and seemed to know nothing of what had happened. Expectant treatment was observed, with daily improvement in his general condition. The wound healed rapidly;—within three months he was able to be up, his paralysis much better, and making great efforts at speech.

Now comes the feature of this case which furnishes the largest part of its interest, viz.,—

Before the accident, as related, the boy could read, write, and cipher. On recovery he had lost all recollection of his alphabet, and had to learn it over again; but his capacity for calculation had improved tenfold, his memory in the use of figures being considered remarkable as compared with his former state. Who can account for this peculiar physiological condition? In due time complete restoration to health took place, and three years afterward I presented him to the Buffalo Medical and Surgical Society, when no one could discover that he had ever been injured. Indeed, doubts that the bullet had ever entered his head were freely expressed. It so happened, however, that about nine and a half years after this, in an altercation with one of his father's men in the field, he was struck with a hoe on the right side of the head. His skull was fractured, and he died a few days afterward. The coroner ordered a post mortem, and a careful examination of the brain found the bullet sacculated in the posterior portion of the left hemisphere, lower in the brain mass than the point of entrance. Although the two gentlemen who made the autopsy looked carefully for any evidence of the track of the bullet, there was none. Now, Mr. President, this seems to me a remarkable case, affording proof, first, that the brain may suffer much injury with little or no serious consequences, and that therefore many of the operations either made or suggested recently have a warrant of comparative safety,

if not utility. In the second place, that the curious phenomena of loss of all knowledge of the alphabet and gain of greater acuteness in arithmetic point to many yet unexplained functions dwelling in the cerebral mass, making it incumbent upon us to dip deep and accurately into an inquiry of "promise" and an elucidation of "fact."

While on every hand the keenest interest is manifested in the possible as well as probable means of cure or alleviation of the diseases of the cerebro-spinal centres, specialists most minutely describing the pathological conditions that begin, carry on, and end certain forms of these diseases, we are frequently reminded of their failure to find therapeutical means in any degree corresponding with their apparent knowledge of the disease given. Among the most common illustrations of this difficulty will be found locomotor ataxia, the correct diagnosis of which is probably as well established as that of any other ill to which the human body is exposed, and its fatal ending, sooner or later, only too well understood. The following case will therefore afford a subject of interest as regarding the possibilities of future investigation or experiment:

J. R., aet. 43, unmarried, section boss on a railroad, was admitted to hospital January 12, 1886, with all the well marked evidences of locomotor ataxia in what might be called its second stage, for the earlier symptoms were felt in 1885, and progress, though slow, was perceptible. He was subjected to a treatment of alteratives, tonics, friction, massage, and a carefully regulated diet, until December 10, 1886. During these eleven months he sometimes thought himself better; at other times worse; and, indeed, it may be fairly stated that there was no improvement in his condition. He walked about the wards, making himself useful, using a stick or cane, and watching his feet for security. On December 10, an attack of facial erysipelas—on account of exposure to cold—set in, spreading very rapidly all over face and head. On the second day he became violently delirious, requiring two men to take care of him. This character of his delirium lasted some four days, when it began to lessen, so that on the eighth day he was rational, the inflammation having ceased to spread two days before. Not to make my description tedious, suffice it to say that on the 28th of the month he had entirely recovered from his attack of erysipelas.

Some days after the restoration of his lost strength, I found him acting as one of the nurses of the ward, and noticing that neither stick nor foot watching was essential to his active movements, I at once examined him for the former evidences of his ataxia. None were there, and every feature common to health seemed to be present. I called the attention of my neurological friends, who had examined him carefully several times before the erysipelatous attack, to his new condition. Surprise very naturally took possession of them all, and disbelief in the permanency of ataxic *cure*. We kept him in the hospital as a nurse for some three years, and took pains to exhibit him to medical men and students as an instance of recovery from locomotor ataxia.

Now, the interest of this case, of course, lies in the explation of the relation between the recovery and the erysipelas. What is the rationale? What does the fact promise?

DISCUSSION.

Dr. E. N. Brush, of Maryland, said that it was difficult to explain according to our present theories how a sclerosis of the columns of the cord, with destruction of the tissues which go to make up and carry on coördinate movements, could be cured and the broken-down tissue replaced by an attack of erysipelas. With all due deference to Dr. Cronyn's diagnostic ability, it was possibly one of those occasional cases called "pseudo-tabes." He knew of a man, who was at present keeping a drug store, who was able to go about the streets without a cane, who had been under his care at one time for nine months for a condition of apparent disease of the brain and cord. He had been seen by some of the best specialists in Philadelphia, who had agreed that the disease would surely prove fatal. For a period of at least three years this patient had every evidence of locomotor ataxia, and even his brain had apparently become involved. It was impossible to say what cured this case, unless it might be the administration of the iodides. It was, of course, barely possible that an extension of cerebral meningitis down the spine might have produced some such effect as results from stretching. It is well known that the suspension treatment temporarily benefits these cases, and it has even brought some relief to certain cases of general paresis.

Dr. George E. Fell, of Erie county, said that he had watched Dr. Cronyn's case with much interest, and that it had presented exactly the

same symptoms as did a number of other cases of locomotor ataxia which were under Dr. Cronyn's care at the same time and in the same hospital.

Dr. CRONYN, in closing the discussion, said that there was no history of syphilis in the case, and that the patient had never been subjected to antisyphilitic treatment. It was well known that sometimes, in some inexplicable way, some apparently accidental circumstance will restore reflexes which had been entirely lost; and in cases where death had resulted from other causes, the lateral columns of the cord had been found to be greatly increased in volume, and their blood-supply likewise increased. During the attack of erysipelas, the patient was given an initial dose of calomel and rhubarb, and then he received the muriated tincture of iron, in drachm doses, every hour. There was violent delirium, and the congestion of the conjunctiva reflected the condition of the vessels of the pia. It was probable that this congestion extended down the cord, producing a hyper-induration of the lateral columns, and thus explained the entire absence of the reflexes. The patient could neither walk nor stand with his eyes closed.

In one case, which he thought was hopeless, an apparently respectable lady, without special history, came under his treatment. She was given Indian hemp, nux vomica, and bromide of potassium; and, to his astonishment, within three weeks she was perfectly well. This was a genuine case of pseudo-tabes. He then took the trouble to inquire from others into her habits of life, and found that she was habitually intemperate. The case was really one of alcoholic neuritis. Unless one were on his guard, such a case might very easily be reported as an instance of cured tabes.

DISCUSSION ON ALIENISM.

October 29, 1891.

THE CAUSATION OF INSANITY:—HEREDITY AND ENVIRONMENT.

By J. B. Andrews, M. D., of Erie County.

It is not my intention to write an essay upon heredity and environment as causes of insanity, but rather to point out in a few words some of the limitations of their operations. We would not, as some have done, deny the force of heredity, to which science has already given a prominent position. We may, however, very properly question the extent of this influence.

That there is an heredity of physical characteristics is patent to the most superficial observer. The history of nations and of families, and our own individuality, present the most irrefutable proof. The Jewish race is a notable example in the life of nations, and instances of the transmission of physical characteristics in families and in individuals are so common as hardly to attract attention. The force of heredity in mental peculiarities is not so fully marked; genius, intellectual power, ability, and other pronounced mental traits, are less constantly transmitted than the physical. In but few instances do the children of great men equal their progenitors, and when this occurs, in the second generation there is usually a return to the general average of mental power.

As physicians, we are especially interested in the heredity of disease, and in this study we are met in the outset by many diverse opinions. Some deny entirely the transmission

of disease, on the broad ground that evolution teaches the survival only of the fittest, and that environment leads only to variability and reversion to the normal healthy type.

It has been strongly stated that disease is not a law of our physical or mental being, and the instances in which there has been an apparent transmission of diseased states are said to be exceptions to the natural law.

By some, however, the heredity of disease is claimed to be a controlling and overmastering power which exercises its influence from the ancestor to the progeny, even through several generations.

The force of heredity is paramount in diseases of the nervous system, and especially in that array of symptoms to which we give the name of insanity, and the drift of medical thought is toward giving it the position of a direct and exciting, rather than a predisposing, cause of disease.

This view divorces us from the long accepted definition of heredity, as a tendency to transmit the physical characteristics from the parent to the child, as it acknowledges the actual transmission of disease. Granting this, it takes from the individual all power in the premises, and makes life but the result of a fate which he can neither combat nor successfully resist. To give heredity as the efficient cause of disease is to ignore, in a given case, all the diseases and debilitating influences with which the life may be surrounded.

Let us examine for a moment the grounds upon which this claim for the fateful force of heredity rests;—and, first, What information do we gain from statistics?

Here there is the greatest diversity of statement. Figures are presented, showing that ninety per cent. of the cases investigated are subject to this influence, while other observers find only ten per cent. As usual where there is such diversity, the truth must lie in the midst; and the general concurrence of opinion is, that from twenty-five to thirty per cent. present evidences of the existence of insanity in the ancestral line. To show the force of such statistics, we have but to make a simple arithmetical calculation. For instance,

in the United States it is assumed that there is one insane person in every five hundred inhabitants. In a population of one hundred thousand, there would be two hundred insane people, of whom fifty would have an insane ancestry.

Even if we believe heredity to be an efficient cause of insanity, we cannot give it the credit in all of these cases, as examination shows that in many of them there is a definite, exciting cause outside of heredity, sufficient to produce the disease. In these cases, heredity is evidently but a predisposing, or, at most, a contributing cause. There remains a certain number in which there is no apparent element of causation save heredity. But are we justified in assigning this as the efficient cause, when we recall the fact that we are compelled to place a large percentage of all cases, even those in which there is no heredity, among the list of "unascertained" in our table of causation.

In making up statistics of heredity, there is a liability to error from the fact that insanity in collateral branches of a family is often included where, by the very nature of things, it could exert no influence. The percentage of heredity is sometimes further increased by counting cases in which the insanity in the progenitor occurred after the birth of the person afflicted, as well as those in which the disease was the result of injury or of the breaking down from age, or was of such temporary character as to have left no impress upon the organism.

There is a great tendency to exaggerate the force of heredity. In criminal cases, the family record is most carefully scrutinised, and every case of eccentricity, of strong individual traits of character, all irregularities due to vicious habits and indulgences for generations, in both the direct and collateral branches, are brought forward as evidences of the hereditary origin of the disease, and the criminal is made out to be insane, with often but a scintilla of proof of actual mental disturbance. An exceptional family history like the Juke family, one in ten thousand, is paraded as a striking example of heredity. This numerical method does not take into account

the accidental or incidental circumstances which develop or intensify the causes capable of producing insanity in each member of the family, without reference to the relationship.

After making these criticisms regarding the position given heredity as a cause of insanity, the question naturally arises, What place shall we assign to it? What power shall we give it? To this we cannot reply by figures or by any formula, but can only lay down broad principles by which we should be governed in forming an opinion.

First: Heredity alone does not produce insanity. Second: The force of heredity is found in a greater liability in the individual to become insane, under some exciting cause existing in the environment. Without such exciting cause, the tendency or liability may remain latent, and the person escape from its influence.

To illustrate: Of two persons subject to the same exciting causes of insanity, as ill health, grief, overwork, or the control of evil passions, the one in whom there is an heredity may become insane, while the other, without heredity, may altogether escape an attack. The force of heredity is, then, an increased liability in the organism to break down or yield to disease under favouring conditions.

There is no unerring rule in the transmission of this liability from the parent to the child; often it is not reproduced, and again it exists in only one or two instances in a large family. Sometimes the weaker and more feeble, and sometimes the stronger, of the children receive the unfortunate tendency. There is no fatality about it, as it is not handed down as disease.

We stated that there must be some exciting cause to energise this tendency. Of this, the conditions under which insanity is most liable to occur furnish the strongest argument. These are found in the changes which the system undergoes in the development of puberty. Dr. Clouston says, "As regards mental disease this period is of the profoundest importance, for it is then that hereditary qualities

come out most markedly." With the same evolutional period other nervous affections, as epilepsy, convulsions, and hysteria, are associated. The other epochs of life, as the marriage state, the child-bearing period, the climacteric, in both men and women, are also associated with special danger to such as have any hereditary predisposition to mental disturbance. It is of course impossible to decide upon the exact force of heredity in such conditions, but we must bear in mind that in all of these cases there is an exciting cause, which in many another case, and without hereditary predisposition, is alone sufficient to inaugurate insanity.

The view advanced by laymen, and which also influences the medical mind, that because insanity has existed in the family of a patient there is little or no hope of recovery, is one we may honestly oppose. It is a frequent occurrence for the friends, and often for the physician, to express the opinion that the patient will never get well because there is insanity in the family. We may safely deny the inference from the premises. It is not true that the existence of heredity compromises recovery; on the contrary, these patients recover as readily as those in whom there is no such taint. They may be more liable to yield to another attack, but it is also true that all who have had an attack of insanity are more easily affected by circumstances favourable to its development than they were in the first instance; and this must be taken into consideration in judging of the liability to the recurrence in cases showing an hereditary tendency. The same is true of all other diseases, and in this, insanity presents no exception. Every attack of a given form of disease increases the liability to its recurrence under the same or even under less forcible untoward conditions. It is true, in cases both with and without heredity, that recurrent attacks diminish the chances of final recovery, and other forms of disease present the same facts.

There is a certain dread of heredity in the popular mind, from a belief that it is a law of our being, irrevocable and unchangeable. There are families, the members of which

when one has been insane, live in constant fear of its recurrence, and every condition of nervous depression awakens a dread of the disease as a heritage.

Can we do nothing to remove this fear of a supposed threatened calamity? And first, as regards the individual who is so unfortunate as to have an insane ancestry: We may confidently assure him that there is no fatality about heredity, as it can only become a factor in the production of insanity under conditions favouring its development. What are these conditions? They are such influences as induce deteriorations of the general health, and especially such as impair the vigour and integrity of the nervous system; they are mental or physical overwork, all of the vices and excesses of life, and, in short, any disregard or transgression of the laws of health or well-being. These untoward influences are extrinsic or due to environment, as opposed to the intrinsic or heredity. By controlling them, we remove to a great degree the conditions favourable to the operation of heredity in the production of insanity. Environment, while on the one hand it may intensify and light up the power of heredity, on the other hand becomes a most potent weapon with which to oppose it.

We have stated that heredity has the most force at the adolescent period of life. While there is then the most danger, it is also the time of greatest mobility and readiest control. The child is under parental influence and authority, and his environment is largely a matter of choice. Under judicious care, his health, his exercise, his habits, his education can all be directed in proper channels, and so controlled as to minimize the risk of an outbreak of mental disturbance. Following this, comes the second period we have spoken of,—during the years of maturity, when, under favouring conditions of environment, insanity is developed. Here, then, is an opportunity for the individual to exercise a strongly restraining influence, and so to live as to overcome heredity.

When we consider how the majority of men and women live, what transgression of the laws of health they commit,

we need not wonder that so many become insane, but, rather, that so many escape the consequences with their lives. Intemperance in eating, in drinking, in work; neglect of the necessary demands for sleep, for rest, and for recreation; excesses in the sexual relations,—all become efficient factors in the production of insanity, either with or without heredity. All of these are matters of environment, and largely within the control of the individual.

The trials of life, as grief, anxiety, and worry, while not so completely under mastery, may often be overcome by strict attention to the laws of health, by cultivating self-control, and by the exercise of a philosophic spirit in meeting the misfortunes and reverses of life. It is by such measures that we would combat the influence of heredity.

When we consider the means at hand to prevent its transmission, we are more completely masters of the situation. The return to the healthy type may be sought in environment through the law of variability. In establishing a family with a wish to avoid the dangers of heredity, the selection of a mate is of the most vital moment. If one is chosen who is of healthy stock, free from insanity or tendency to neurotic disease, the result may be a family line subject only to the ordinary accidents of disease and without hereditary tendencies. With such care in selection, and with due attention to a favourable environment, we furnish the best prophylaxis to insanity.

We may be met with the criticism that such advice is valueless, as it will not be carried out in practice. For this, however, we cannot be held responsible, as it is for us, as physicians, to indicate the means by which disease may be averted. In the treatment of some forms of disease, progress has been made along these very lines.

In tubercular disease of the lungs, every assistance is sought from climate, from hygiene, and from control of the marriage relation. In cases threatened with insanity and nervous disease, the same end must be reached by the same measures. The whole environment and all the relations of

life must be called to our aid, and made subservient to the purpose we have in view.

In these few remarks my aim has been, while acknowledging the existence of heredity, to point out some of the limitations to which it is subject; to remove it from the position of an irresistible force which cannot be overcome; and to show that in environment we have a strong weapon with which to oppose its influence.

TRAUMATISM, SHOCK:—MORAL CAUSES AND CAUSES OPERATIVE AT PHYSIOLOGICAL EPOCHS.

By H. M. Hurd, M. D., of Baltimore, Maryland.

The branch of the subject assigned to me in the programme includes much more than I can well speak of in the short space of time allotted, and I must of necessity restrict what I have to say to traumatism and shock, leaving moral causes and causes operative at physiological epochs out of the scope of the present discussion. Under traumatism as a cause of insanity, we include all cases where an injury has been done to the skull or its contents, whether by sunstroke, or, more properly, heat-stroke, shock, concussion, laceration of brain tissue, or fracture of the skull, by direct violence or by *countre coup*. By these agencies we may have a change in the intimate nerve constitution of the brain by excessive heat, as by sunstroke; or a secondary meningitis following either a sunstroke or an injury which may destroy the tonicity of the vessels, or make pressure upon them to the derangement of the normal circulation; or direct pressure upon the brain by a depressed fragment of skull; or counter pressure by *contre coup;* or laceration of brain substance from a general shaking-up of the contents of the skull cavity; or an acquired susceptibility to mental disorders from an injury in childhood, which may be as potent for evil as a strong hereditary predisposition.

1. *Heat-Stroke, with or without Secondary Meningitis.*

I will speak first of heat-stroke. The effect of excessive heat upon the animal tissues is well known. The walls of

the blood-vessels first become paralysed and the blood current is slowed. This slowing of the blood current in its turn slows the action of the heart, and in fatal cases death results from obstruction in the lungs or from the brain through pressure upon the nerves of respiration. As we are alone interested in its effect upon the brain, I will speak of the effects of heat upon the brain exclusively. Its primary effect is to produce a passive congestion of the brain which may go on to an active inflammation followed by convulsions, paralysis, active delirium, unconsciousness, and death. In fatal cases the veins of the dura and pia are distended. Frequently, also, the brain substance is softened, and its consistency destroyed.

The far-reaching character of heat-stroke as a cause of insanity cannot be overestimated. In many instances, where patients seemingly recover from the first effects of the stroke, irritative brain lesions remain which cause attacks of chronic mental disease, or render the patient an object of terror to those who are brought into daily contact with him. The leading character of the insanity which follows heat-stroke resembles that of traumatic insanities as a class. There is the same suspiciousness and apprehension, which sooner or later mark the victim of chronic insanity of traumatic origin. The effect of the heat-stroke may be manifested at first by delirium of a transitory character, or a mild attack of maniacal excitement from which recovery seems to be complete. It is noticeable, however, in the majority of these cases, that the recovery in the sense of a complete restoration does not occur, but that the ability of the patient to resist excitement or fatigue, or the wear and tear of civilised life, is diminished. The patient's mind ceases to develop. He becomes self-centred, and no longer has the same control of his faculties or the same ability to conceive ideas and to execute them. Sooner or later he withdraws from his former free association with his fellow-men, and becomes gloomy, depressed, suspicious, excitable, and finally displays a marked degree of mental impairment. The degree of impairment

depends largely upon the degree of damage done to the brain or its membranes, and the native constitution of the individual.

The records of asylums and hospitals for the insane contain the histories of many chronic cases whose insanity has dated from an attack of sunstroke. In a number of cases which came under my observation, epileptic insanity had a similar origin. When the heat-stroke has produced a change in the ultimate molecular constitution of the brain, a progressive dementia seems the rule. When, on the other hand, the brain injury has produced a secondary meningitis, there will be periods of excitement, delusions of suspicion, and afterwards of apprehension, and finally a train of symptoms allied to paretic dementia.

2. *Direct Injuries to the Head.*

In these injuries we have to do,—

First, with shock, the effects of which differ according to the lesions produced. In many instances the shock expends itself seemingly upon the general nervous system, producing a condition of instability which renders the patient emotional, hysterical, impulsive, and lacking in will power. He becomes a prey to irritable impulses, or the sport of hypochondriacal fancies. In many instances it produces a condition of neurasthenia, from which recovery is tedious and often uncertain. These are the cases which yield the richest harvest for the hypnotiser, or the faith and mind curer. They are often in an irresponsible condition for days, weeks, or months. Passing by the more prominent nervous symptoms, which are legion, as railway spine, local paralyses, sensitive points, contractures, neuralgias, etc., I will speak merely of the mental disorders. These are, inability to exercise the will or control the mental faculties, depression, hypochondriacal fancies, loss of memory, lack of purpose, failure of the power of attention, and a general lowering of moral tone in the individual. Associated with this condition we frequently have purposeless excitement, destructive tendencies, attacks

of unconsciousness and hysteroid manifestations. A typical case of this sort has been reported under the title of "Traumatic Hysteria," by Dr. Andrews, in the *Journal of Insanity* for July of the present year. In this case it may be remarked, in passing, that the recovery of the patient was unquestionably promoted by hypnotic suggestion. In other patients the shock of an injury may produce an actual psychosis, giving rise to delirium or mild excitement. These psychoses are generally comparatively transitory in character. When, however, they are followed by congestion or inflammatory reaction, a graver set of symptoms develops. These may not, and generally do not, develop immediately, but sooner or later give rise to chronic insanity of various kinds.

Second. We have to do with injuries to the brain itself, either by direct pressure at the point of injury, or from *contre coup*. Here you may have a pressure upon the brain from a depressed fragment of the skull, or a bruising and laceration of the brain tissue from the violence of the blow. The mental symptoms of these injuries vary widely in character from simple delirium to a total abolition of mental function. The termination of these injuries is always uncertain. Many cases go on to recovery; and many others, who seemingly recover, become hopelessly impaired in mind. Take the following illustrative example:

H. G., a bricklayer, of good habits, received a blow from a falling brick upon his head, which did not produce any fracture of the skull, several weeks prior to coming under observation. He was stunned and confused by the injury, but did not lose consciousness, and was able to walk to his house. His pupils were unequal, and his articulation impaired, but there were no other evidences of paralysis. A few hours afterwards, while walking in his garden, he had an apoplectiform attack, attended with loss of consciousness and right hemiplegia. He remained in a state of semi-coma for several days, during which his breathing was laboured and all motor power was practically abolished. There was no aphasia. He could be aroused from his lethargy, and answered questions correctly. His paralysis disappeared at the end of a week, but his mind remained confused and his memory was impaired. He imprudently exposed himself to the sun, became dizzy, had severe pain in the region of the occiput, and again lost consciousness. This condition was fol-

lowed by a similar train of symptoms, which terminated in a partial recovery, as before. From this time on he progressively lost mental power, and, becoming excited, extravagant, and unnatural in conduct, his transfer to an asylum for the insane became necessary. He was then found to have hemi-anaesthesia, marked muscular incoördination, unilateral perspiration, and loss of power on the right side. He could not remember his room, his place at the table, or any of the common events of his daily life. At the end of three months his memory had improved, but his mind remained feeble, and he displayed irritability, changes in sentiment, and general characteristics which were inconsistent with his former personality. These peculiarities have become fixed, and he has never since been able to maintain himself or to engage for any length of time in any occupation.

In another case, where the patient sustained an injury to the head by being thrown from his carriage upon a paved street, there was complete loss of consciousness for a few hours, and a state of great mental confusion for several weeks. When he had seemingly recovered from this, his whole mental constitution seemed changed. He was unable to apply his mind to business, and took no interest in any of the details of a large corporation, whose efficient manager he had been for many years before. He also displayed an equal change in his relations to the members of his family. Formerly a kind and tender parent and thoughtful husband, he became irritating, teasing, unfeeling, and unpleasant to his children, and perverted in his feelings towards his wife.

3. *Acquired Susceptibility to Mental Disease from Injuries in Childhood.*

The effect of injuries to the brain in childhood, to produce mental disease in later life, has never been fully estimated. There is no doubt but that many cases of insanity develop in later life in children possessing no hereditary tendency to insanity, who have sustained injuries to the head. The effect of such injuries is to lessen the brain resistance of the individual, and to render this organ prone to functional disorders. Such children are apt to develop serious mental disease at the physiological epochs of life, when an extra strain

is brought upon the organisation to fit it for the evolution of a new set of functions or unaccustomed activities. Puberty is especially trying to such children. Many also develop acute exhaustive mania at adolescence. In some instances, it is true, these patients develop epilepsy. The majority, however, do not.

4. *The Mental Symptoms in Traumatic Insanity.*

The mental symptoms in traumatic insanity are quite constant, so constant, in fact, as to lead many alienists to constitute a separate group for them. The most characteristic feature of the developed insanity is the presence of delusions of suspicion and apprehension. The patient is abstracted, reticent, retiring, prone to misinterpret motives, and to misjudge the actions of others. These delusions of suspicion may occasionally give place to brief attacks of exaltation and impulsive excitement. When the delusions of suspicion are thus transformed into delusions of exaltation, there is always reason to suspect that the patient originally had the brain condition, now so well known as paranoia, which only needed a cause as potent as traumatism to develop it. In those cases where the mental disturbance does not extend so far, we may sometimes have perversions of feeling, and changes in the character and personality of the individual. As in the case which I have related, the model husband and father becomes a fiend. Tendencies to vice and crime, in fact, are apt to accompany traumatism. I remember an inebriate, whose presence had been a source of serious discomfort to many hospitals, work-houses, asylums, infirmaries, and other public institutions, whose career of insane viciousness, or vicious insanity,—I know not which,—had its origin in an injury received in battle. In the secondary stages of traumatic insanity, dulness, apathy, suspicious and irritable dementia, and chronic confusional insanity, with a tendency to violence, are frequently developed. In certain rare cases, as a result of irritative lesions, you may have epileptiform seizures. The onset of these varied symptoms is generally

slow and insidious. The prognosis is, almost without exception, bad.

The proportion of cases of traumatic insanity is variously estimated by different writers. Some believe that as many as ten per cent. of cases of insanity are of traumatic origin. In my own experience, which has been gathered in an asylum largely, I should say that about three per cent. of cases requiring asylum care were due to traumatism.

ARREST OF DEVELOPMENT AND DISEASES OF INFANCY.

By Edward N. Brush, M. D., of Baltimore, Md.

It seems to me rather hard that Dr. Andrews should ask a young man, who in his still younger days sat at his feet as at those of a psychological Gamaliel, to place himself in the position that I find myself occupying.

He has told you all—no, I will not say all, for Andrews always holds some reserve ammunition—about heredity as a cause of insanity, and then asks me to say something about arrest of development and the diseases of infancy. He knows very well that these conditions might be summed up in the words of Goethe on another subject, "It all depends on the relations."

After a period of nine months' utero-gestation the human being comes into the world, and the brain with which that being is equipped for future use goes on developing, regularly or irregularly, as his heredity permits, for some twenty-five years longer before it attains what may be called maturity. At any point within that period, and more commonly at any point during the period which we designate infancy and childhood, some arrest of development, some aberrant growth of the brain arrests or disturbs mental development, and we have idiocy, imbecility, or insanity, the latter occurring more commonly from these causes at some of the psychological periods of early life—adolescence or puberty.

Surely Dr. Andrews, in his invitation to me to take up this point of the discussion on the causation of insanity, did not expect me to enter into this vast field. In the first place, as I have intimated, he has gone necessarily into it himself, and then Dr. Hurd has touched upon the causes operating at the

psychological periods, and both have treated these features of the case better than I could hope to do.

In an article on idiocy and imbecility for Keating's Cyclopaedia of Children's Diseases, I said,—"The moral imbecile has his counterpart in the case of so called moral insanity; and the erratic conduct and one-sidedness of the feeble-minded child are but earlier manifestations of the 'partial insanity,' 'paranoia,' 'primäre verrücktheit,' or 'folie héréditaire,' of later development." It is a difficult matter in the life history of many lunatics to trace back to a point when there was not some neurotic manifestation sufficiently marked to attract common observation and comment.

Clouston, in a series of recent lectures on the neuroses of development, says,[1]—"It will no doubt be possible . . . in the future, to correlate and classify the whole of the neuroses of development into one large and most interesting scheme, so giving a physiological coherence to what have been hitherto unrelated pathological facts. I believe, if our knowledge of heredity and physiology were sufficiently advanced, we should be able to fit into such a scheme, and to show the true relationship of the acephalous foetus, the hare-lipped, the cleft-palated, and the open-spined child,—the congenital imbecile, the deaf and dumb, the cases of infantile delirium, and *furor nocturnus*,—the convulsions of teething, those of chorea and epilepsy occurring before twenty-five, the speech defect of stammering, infantile paralysis, megrim, Friedreich's disease, hysteria in girls, possibly phthisis and acute rheumatism, the insanities of puberty and adolescence, as well as many moral perversions, volitional paralyses, and intellectual peculiarities which are met in both sexes during the developmental period of life."

The catalogue of diseases which Dr. Clouston has here included is extensive; but every observer will, I think, recall case after case in which the series has been almost completely represented in a few generations. Nothing, I think, impresses itself upon the alienist more forcibly in making up

[1] Edin. Med. Jour., p. 595, January, 1891.

his tables of causes than the presence in the history of many of his cases of a more or less definitely defined degenerative trace, which can, in those whose histories are known, be followed out through several generations. The psycho-neuroses of the degenerative and developmental type, the idiocy and imbecility of infancy and childhood, the mental and moral perversion of youth, with the insanities of adolescence and puberty, the later developed paranoia, all belong to the same class, are all but different expressions of developmental defects and inherent weaknesses. It is as if we should say that one child started with impaired brain capital, another, with barely sufficient to meet the physical demands and with little or none for mental work, another with sufficient for a brief career of apparent mental health, to end in the mental breakdown of puberty, and another with sufficient to last until early manhood, or, possibly, middle life.

The relationship of varying and apparently dissimilar mental and nervous defects is easily followed out, and, once our attention is attracted to the matter, becomes sometimes very striking. I saw, a few weeks since, a child of three, whose parents were anxious concerning it because the little one did not talk. The child was somewhat undersized, but otherwise fairly well developed. Sight, hearing, and attention were seemingly normal, but attempts at speech were only productive of harsh, discordant sounds. There was some lack of intelligence,—an absence of the brightness and vivacity to be expected in a child of that age. While examining the child, two older children came into the room, returning from school. I had been told by the parents that there was no nervous defect or disease in the family, but I soon learned to the contrary, for both these children were bad stammerers, and, later, a third, the eldest, showed the same defect, though to a less degree.

A few days ago I saw the father, in the excitement of a hurry, trying to give some directions to a workman, and I observed that he then had some speech defect which in his calmer moments was not observable. While preparing this

paper, a bright appearing, well developed boy of ten was brought to my office for an examination and opinion. Up to the age of nine nothing that would distinguish him from other children was observed. He attended school, was quick to learn, attentive and obedient, but for some months he had been irregular in his attendance, playing truant frequently. He has become disobedient and untruthful, and a most persistent thief. His father, not recognising the trouble, had frequently punished him, but with no result. Just after being punished for one theft, he broke out of the room into which he had been locked, and, entering a neighbour's house, stole a watch. No neurotic heredity was admitted in this case, but the father is phthisical, the mother "nervous"—which may mean much or little. The boy has a symmetrical cranium, with a highly arched palate, somewhat stubby hands and fingers.

If I am asked the causes of these developmental cases, I shall have to refer you to Dr. Andrews for the heredity. I can only say that they exist; that the same tendencies which produce idiots and imbeciles produce insanity, and insanity of a type which is commonly beyond remedy.

In the development of the insanity, the active periods are at certain physiological crises,—teething with its convulsive attacks, the onset of infantile paralyses, adolescence, puberty, etc.;—but these belong to Dr. Hurd to discuss.

The relationship of certain cases of the insanity of adolescence to idiocy and imbecility is shown by the presence in many of these of the deformed or neurotic palate. Long ago it was observed that the palate in many congenital idiots was highly arched, V or saddle shaped, and some writers upon the subject, like Langdon Down, announced that it was characteristic of idiocy; but the deformed palate will be found in persons of unimpaired mental vigour, and is absent in many idiots. There is, however, an undoubted relationship to this, one of the forms of physical asymmetry, and to the unsymmetrical mental development of idiots and the general line of cases now known as the "degeneratives."

For some time my attention has been attracted to the frequent presence of a deformed palatal arch in cases of adolescent insanity and the insanity of puberty, and last fall my attention was again directed to it by seeing in the Morningside asylum, Edinburgh, some casts prepared by Dr. Clouston and his assistants; and I have the pleasure of exhibiting some casts taken, through the kindness of Dr. Chapin and his assistant, Dr. Moulton, from some of my old patients at the Pennsylvania Hospital for the Insane, of Philadelphia, to illustrate this point. Dr. Clouston distinguishes three classes,—the typical, the neurotic, and the deformed,—represented by these casts. While among certain classes of idiots and insane the typical form is by no means uncommon, one of the other forms will more commonly be observed among cases of the neuro-degenerative type—the forms due to faulty development and naturally falling under the head given me to discuss. These three classes blend and run into each other, and are varied by numerous modifications.

I think, with Clouston, that any one taking into account the close and necessary relationship of the upper maxillary bone with the base of the skull, and the necessary dependence of the skull base and palate on the brain, will recognise that we have in the shape of the hard palate some index of brain development. Less than one fifth of the palates of the ordinary population are deformed, while among idiots only one tenth have typical palates and over two thirds have deformed palates. Clouston gives a table from which the following figures are taken:

	Typical palate.	Neurotic palate.	Deformed palate.	Number examined.
General population	40.5 per cent.	40.5 per cent.	19 per cent.	604
Acquired insanity	23 per cent.	44 per cent.	35 per cent.	761
Adolescent insanity	12 per cent.	33 per cent.	55 per cent.	171
Idiots and imbeciles	11 per cent.	28 per cent.	61 per cent.	169

He says,—"The vaulted palate or altered dental arch must be taken, with other changes in the head, and especially in the facial expression, as one of the morophological indications that show a tendency in the person to whom it belongs, and in his family, toward developmental neurotic diseases, notably, idiocy, congenital imbecility, stuntedness of growth, deformity, epilepsy, adolescent insanity, and that organic lawlessness and lack of mental inhibition or weakness of mind that distinguish the criminal class. It thereby is one of the marks of a family that is tending toward mental death and extinction."

Had I not far exceeded my time, I could say something concerning the diseases and accidents of infancy and childhood as causative of insanity.

Prolonged and instrumental labours have their effects in the production of idiocy, and it is not at all improbable that mental defect of later development than idiocy is caused in the same way in some instances.

I presume my friend and former colleague, Dr. Blumer, will touch upon intemperance and syphilis in their relations to the growth and mental and physical development of children, and it is not, therefore, necessary for me to dwell upon those points. The inflammatory exanthematous diseases of childhood may, and as the subsequent history of cases shows do, start a train of degenerative processes which sometimes end in mental break-down.

The subject, as you see, opens up a wide field of discussion; and I trust that those here who see the causes of which we hospital men see the effects will join in an attempt to classify and thus render them more easily examined and studied.

The complex relations of development as influenced by heredity, environment, and the accidents and ills of life which beset childhood, are so numerous and involved, that we can only seize here and there upon some salient point and examine its relations to mental break-down. We see but in part, and hence we know but in part. Upon the general practitioner devolves the duty of carefully examining and studying these cases and recording their various features.

BODILY DISEASES AND SENILITY.

By P. M. Wise, M. D., of St. Lawrence County.

That part of the discussion of causation of insanity that is apportioned to me requires length of consideration far in excess of the time I assume will be allotted to me. I am therefore compelled to omit the consideration of predisposing conditions, and to ask that some admissions may *a priori* be granted.

The degree of brain stability, and its power of resistance against a tendency to disorganisation, either inherited or acquired, are the most important features of this discussion, and will receive appropriate consideration; but no part of the subject of causation of insanity can be dissociated from it. It is the prime factor. Given a certain measure of brain stability, if it could be measured, and analogously the weight of brain stress from whatever cause, external or internal, results could be measured with almost mathematical exactness.

It must be remembered that some brains are certain to lose their equilibrium at some time before death. It may be a physical cause, or it may be a moral shock, to which the debt is charged, but the assignment is often aetiologically illegitimate. There are brains so tough that no cause whatever will disturb the reasoning powers, and between the two there is an endless gradation. We may congratulate the human race that the proportion of brains of individuals in whom insanity can be produced, aside from gross organic lesions, is still small, but indications point to an increase.

From the collective record of causation of insanity prepared by Dr. Major from ten years' reports of the English Commissioners in Lunacy, it is shown that bodily diseases

contribute from twelve to fourteen per cent. of causes in both sexes. This in addition to pregnancy, the puerperal state, and lactation, which causes are observed to have contributed from nine to ten per cent. of the female admissions.

Bodily disease acts secondarily in creating psychoses, through defect in blood-supply either in the quality of the blood itself or in vessel changes, through excessive nerve energy from peripheral excitation, and from extension of disease from the lower to the higher nerve centre. It may be broadly stated that any disturbance of the circulatory medium or the nerve energies may result in a psychosis of a more or less permanent character.

To the first class of causes may be ascribed all insanity following febrile diseases that have been sufficiently prolonged and severe seriously to affect brain nutrition. The post-febrile insanities contribute but a small proportion of causes, and smaller than formerly, probably on account of the departure in treatment of fevers from depletion and evacuants. It is noticeable, too, that they are characterised by an absence of active symptoms, and are not frequently recovered from.

The pathological processes that leave a brain disordered after fevers or acute inflammatory diseases are unquestionably vascular primarily, and secondarily an inability to throw off the degraded tissue and renew the elements. Where the tendency of the individual is toward decadence, the circulatory disturbance is apt to leave a weakened "neurotic resistance," and, in cases where the insane diathesis exists, extreme care must be exercised during convalescence to prevent an insanity of an incurable form,—incurable, because the tissue changes are quite identical with those of consecutive dementia following the acute forms of insanity, where the integrity of the nerve-element connection of the cortex has been permanently impaired. The form of insanity here referred to is to be distinguished from the active maniacal deliriums of not more than several days' duration that occasionally follow the decline of fevers.

The relation of phthisis to insanity is not well defined, although that it is a producing factor cannot well be denied. The statistics that exhibit the prevalence of phthisis among the insane in hospitals are not significant, as the conditions of hospital life have a tendency to develop the disease, and its patients are, as a rule, in a defective physical condition, with lowered vitality. Statistics also show very well that inproved hygienic arrangement of buildings, and an active out-of-door treatment, reduce the mortality correspondingly. But that the phthisical diathesis is productive of insanity, and of a distinct form of insanity, as has been well shown by Dr. Clouston, there can hardly be a doubt. He found, from an analysis of three thousand admissions, that causation in more than three per cent. could be ascribed to the phthisical diathesis. As the insanity usually precedes the pulmonary manifestations, it cannot properly be said that the insanity is induced by the disease. The *spes phthisica* is recognised by every physician as a mental state distinctively peculiar. Phthisical insanity is distinguished in a contrary way, by depression with irritability and delusions of suspicion. The development of local tubercular disease often results in amelioration of the mental symptoms.

Heart disease is not uncommonly a direct physical cause of insanity, and that, too, quite independently of other predisposing conditions. It has been shown that the proportion of the insane dying from diseases of the heart is greater than of the sane. It is also well known that among the sane, the change in the character and temperament of the patient suffering from disease of the heart and large vessels places them on the borderland of insanity. The anaemia resulting from aortic stenosis, and the congestion or oedema following mitral disease, are explanatory of not a few cases of mind fracture, in which there exists no other ascertained predisposing cause.

In this connection an observation may be made upon a condition of the blood-vessels, particularly the arteries and capillaries, that until recently has received but little atten-

tion as a distinct disease, but has been recognised as a sequela of chronic Bright's disease. Under more enlightened demonstration it has been shown to have its origin in an inflammation of the arterial lining.[1] This condition is sufficiently frequent in the insane admitted to hospitals, that one of the receiving physicians at the St. Lawrence State Hospital has collected a repertoire of at least ten cases in an experience extending over two years. The stiffened and unyielding radial pulse and symptoms of cardiac disease, with a general expression of premature senility, marks a case as suspicious. The manifestations of insanity in these cases appear to indicate lowered nutritive conditions, and cannot well be confounded with the uraemic insanity of Bright's disease, which, in my experience, is seldom met with in hospitals for the insane, if anywhere.

Insanity occasionally follows an attack of rheumatic arthritis, or occurs during its course, manifesting itself by extreme maniacal activity. The suspension of other symptoms of the disease during the period of mental alienation is common. From its general character and symptoms, it may fairly be assumed that rheumatism may be solely the cause without any other preëxisting tendency. Gout, too, although seldom producing an actual insanity, is responsible for changes in the mental condition of its victims, bordering on an irresponsible mental state.

Of the first class of causes, syphilis undoubtedly exerts the largest influence in the production of insanity of any bodily disease, but as its consideration is assigned elsewhere, it will be passed here with this mention. The multiform traumatic causes of insanity furnish, in the aggregate, only a small aetiological factor. Oftener the insanity is secondary, following some other neurosis. And the same may be said of sunstroke. Exophthalmic goitre and myxoedema, especially the latter, tend toward an altered state of the mind, and frequently to insanity.

A very common assigned cause for melancholia for several

[1] Arterio-Capillary fibrosis.—Chronic Endarteritis (Meigs).

years past has been influenza in its epidemic form. The frequency of the statement made by the friends of patients admitted to insane hospitals, that he or she had never been the same mentally since they had la grippe, would seem to connect the two as cause and effect. The great mental depression that was so frequently a symptom of influenza, occurring during the disease and frequently persisting for many weeks after the attack, would mark it as an unusual disturber of the nervous system, if it be not properly an epidemic nervous disease. Certainly it left in its train an army of neurotes, and, in my belief, it has been a potent cause of insanity and of a broken down nervous condition predisposing to it.

The causes that appear to act reflexly from remote excitation may be summed up under the head of organs subservient to the sexual function. There are the exceptions, in the causes of depraved nutrition resulting from haemorrhages and discharges from the uterine organs, that act in a manner heretofore considered. The popular belief, however, that diseases of the sexual organs bear a very close relation to insanity, I do not believe to be well founded. Uterine disease and insanity are sometimes the result of a common cause. The mental stability of some women, it is true, is often shaken coincidently with the appearance of disturbed menstruation, but the latter is oftener a symptom than a cause, seldom a cause. It is not uncommon to find an insane woman with disordered menstruation, and regularity of the function to follow mental improvement, but it almost invariably follows the mental change. And so with diseases of the uterus and appendages. There is no uterine psychology. The fact that a large proportion of insane women are also the victims of uterine disorders, proves nothing at all. The same may be said of the women of any community. Dr. Alice Farnham, while an assistant physician at the Willard State Hospital, examined consecutively a large number of insane women in the hospital and an equal number of sane women in almshouses and houses of detention, and found that uterine and

ovarian disease in the latter class exceeded the proportion in the former. During a number of years' experience with gynaecologists in insane hospitals, I have yet to see a recovery from insanity that was even remotely due to gynaecological treatment. On the contrary, in a few cases I have feared that it interfered with recovery. The quality of mercy is, indeed, strained, that resorts to vaginal stretching in the case of every insane woman. It is a safe conclusion, that the effect upon the mental faculties of pathological changes in the sexual organs is not sufficiently profound to become a potent cause of insanity, aside from degradation of brain nutrition.

Dr. Skae describes a form of insanity connected with the sexual organs under the head of "Ovario-Mania," also referred to by Dr. Clouston as "Old Maid's Insanity," that is fairly distinct in type, and is characterised by delusions as to sexual intercourse. In one typical case under my own observation, an autopsy revealed no uterine or ovarian disease. It would seem rational to ascribe the cause of insanity in such cases to the class in which suppression of a natural function has led to a perverted outlet for a nervous energy that cannot be wholly suppressed, and has morbidly affected the unstable brain.

The physiological epochs of life—pubescence, adolescence, and the climacteric—present fruitful periods for the unbalancing of unstable brains. The two former—the epochs of development—when coinciding with an attack of insanity, without any other exciting cause, present an illustration of an imperfect organism succumbing to its own development from inherited or inherent weaknesses. During the period bounded by the initial energising of the function of reproduction until its physiological completion, there is an immense stress upon the brain, that bears more than other organs in the unfolding processes, and it is likely at this time to exhibit its weakness in an acute attack of insanity. A great deal might be said that has never been said, about the importance of harmony of development of the body and mind during this important period of life, as a preventive measure of insanity.

The child-bearing and sustaining processes act as frequent exciting causes in women, least during the period of gestation, more frequently following the puerperium, and less again during the lactational period. It is rare, however, that there does not preëxist some constitutional tendency to insanity in these cases, either inherited, or acquired by a life of poverty, want, and overwork. This is more particularly to be expected in the insanity of lactation. Poor women nurse their children, and do so usually under the most unfavourable conditions, the reaction falling upon the mother oftener than upon the child. The mammary secretion is maintained at the expense of brain nutrition. Nursing protracted beyond a period when the body is unable to maintain a proper harmony in its proportions of supply and waste, in women predisposed to neuroses, is a perilous proceeding, and may result in life-long mental alienation.

Extension of systemic diseases of the spinal cord to the brain, as a cause of insanity, provides a very small ratio; but in hospitals for the insane we meet, in the aggregate, many cases of diseases of the nervous system complicated with insanity. It is true that the same constitutional defects may operate in the production of the neurosis and the psychosis, the former the precursor of the mental disorder. It is not infrequent for general paralysis to follow undoubted tabes, and in such cases there is probably a like cause. It is impossible that there can be continuity of extension of spinal disease to the cortex, but it would appear that the irritable and morbidly directed impulses of nervous energy, emanating from degenerative changes in the spinal centres and tracts, do occasionally act as exciting causes of mental derangement.

The cerebro-spinal diseases—epilepsy, chorea, hysteria, and catalepsy, in their chronic forms—are frequently complicated by insanity as a supervening disease. The former, particularly, furnishes eight per cent. of the admissions to hospitals for the insane in this country.

Loss of one or more of the special senses is a cause of

insanity of quite a distinct type, characterised by morbid suspicion and hallucinations of the lost sense. The integrity of the senses is essential to mental health, and even when the derangement does not amount to pronounced insanity, changes in the character of the individual are noticeable. These cases, too, are not to be confounded with brain disorders that are equally the cause of loss of the special sense and insanity.

The psychology of bodily diseases appears to be a neglected subject, and it is seldom that an author of a medical text-book considers it within his field to refer to the mental changes accompanying bodily disease, although every careful observer must recognise "how entirely the integrity of the mental functions depends on the integrity of the bodily organisation." The alienist is not situated to observe the initial changes of the mind in current physical diseases, and consequently must depend largely upon his brethren in the open field of practice for data that can aid in the determination of the relative influence of bodily disorders in the production of insanity. When the fact can be fully appreciated, that every departure from mental health weakens the stability of nerve element and predisposes to a still greater departure, and that insanity, as it is now recognised, is but a superlative degree of such change, it may become habitual for the careful physician to give record to the symptoms presented by the mind, as well as by the temperature, pulse, urine, or other physical indications.

I was expected to treat of the senile period of life as a predisposing and exciting cause of insanity, but my time has already been so exceeded that I trust I may dismiss this subject with one or two observations which I consider it important should be impressed upon the general practitioner and the family physician. The second childhood of life has its normal and abnormal aspects, and from a psychological standpoint we can say there is a normal pathology of old age. The whole process of decadence in old age is one of atrophy and a gradual loss of all the faculties. The brain changes in

its most essential elements, and there is a tendency to a blotting out of those faculties and energies that have been the latest in maturing.

It has been a noticeable fact in recent years, and, I am sorry to say, a growing one, that cases of senility of a class heretofore mentioned as presenting the so called normal pathology have been certified as insane, and committed to hospitals for the care of the insane. With the new "State Care Law" in regard to the care of the insane in full effect, the state maintaining all expenditure for such care, there will be no incentive on the part of the local poor officers to check this formidable increase in the numbers to be cared for on the part of the state, and we can only look to examiners in insanity who make out certificates, to do their duty in respect to this class of persons, in declining to give certificates in cases where mental weakness is undoubtedly due to the natural decline of the mental as well as the physical faculties through advanced age. This is one class of cases that has aided in increasing the aggregate number of insane under care. It is one that is liable to increase through neglect, and, under the changed conditions that are soon to exist with respect to the dependent insane, it is liable to a gross abuse. It is to the profession that we must look for protection of the state's interests in this regard.

In addition to the ordinary declining powers of age, resulting sometimes in almost complete dementia, there are attacks supervening of well defined insanity in its most active form, such as mania and active melancholia with suicidal tendencies. These forms of insanity are amenable to treatment; and I have known several instances of insane patients over eighty years of age, who have passed through maniacal attacks followed by a stupourous condition, and have recovered, and retained a sufficient intellectual strength for several years for their ordinary avocations.

It is true that the ordinary case of senility may reach a condition of helplessness beyond the ability of the family to meet, and that help may be sought, and is reached, through

the insane hospitals that have been so munificently provided by the state and larger cities; but it is a distinct perversion of the intent of these institutions, that were created for the victims of disease and not for old people's homes. These old hulls should be laid aside for final decay in quieter waters, and, above all other considerations, they should not debase our statistics of insanity that already bear the burden of much that does not belong to them.

SYPHILIS AND INTEMPERANCE.

By G. Alder Blumer, M. D., of Oneida County.

Syphilis.

It may be safely asserted that there is no part of the organism on which the effects of syphilis are more wide-spread, or manifest themselves in greater variety, than the nervous system, and it is equally true that there is no department of investigation in which "uncertain knowledge" has figured more conspicuously. Fortunately for me, as well as for yourselves, I am to deal in this discussion, as I interpret instructions, not so much with the theory of causation as with the facts thereof, as revealed by experience and statistics.

At the outset we are met with a difficulty that confronts us in all such inquiries, namely, as to the relative importance that is to be ascribed to a given factor in any case of insanity, for if this discussion has established any indisputable fact, it is this, that insanity is due, except in rare instances, to a conspiracy of conditions, and the best that one can do, as a rule, is to name the arch conspirator. I am aware that there is no scientific safety in the conclusion, that, because a patient has a disease of the nervous system, and has had syphilis, therefore the disease from which he suffers is syphilitic.

Among earlier authorities, Dr. Wilkes pointed out that when the primary and secondary manifestations are least marked, the viscera and nervous system are affected in an inverse ratio. This observation has been fully confirmed by subsequent experience. But the effect of the specific virus seems to bear a relation to the hereditary predisposition to the neuroses, which relation must always be borne in mind in our process of link-making in aetiological inquiries of this kind. Then, again, it is especially true of syphilitic patients, that alcoholic and sexual excesses frequently claim strong

links of their own in the chain of causation. Clouston claims an agreement among all authors that brain syphilis is rare, absolutely and relatively. Few of us, however, who have had much experience with the insane, would claim that cases of insanity are rare in which syphilis plays an important and conspicuous rôle. And if it be held—and the opinion seems to be gaining favour among alienists—that the so called pseudo-general paresis of Fournier, and general paresis, are not essentially distinct diseases, then it cannot be asserted that brain syphilis is a rare affection.

The point has been much contested whether syphilis can and does produce general paresis. There is eminent authority going to show that syphilitic affections of the brain may closely resemble general paresis, and yet be distinct and independent in character. On the other hand, equally careful investigators affirm that syphilis may, and does, engender true general paresis. The subject of syphilis in the aetiology of general paresis, under the leadership of Dr. Savage, occupied a large share of the time of the Psychological Section of the International Medical Congress four years ago, and it was again discussed last year at the National Congress of Alienists, at Rouen, when, as usual, the widest divergence of opinions supported by statistics was elicited. To summarise the discussion in a word, it may be said that those who denied the importance of syphilis in this connection insisted on the necessity of finding syphilitic lesions, while those who took the opposite view depended largely on the history of their cases.[1] Again, in a memoir published this year[2] MM. Morel-Lavallée and Bélières, in behalf of the Academy of Medicine of Paris, gave the results of an inquiry directed to a large number of physicians, in which there were proposed the following questions:

1. Does syphilis produce the clinical type of general paresis, and, if so, with what special symptoms and evolution?

2. Does syphilis figure in the antecedents of general pare-

[1] Journal of Insanity, April, 1891.
[2] Progrès Médical, February, 1891.

sis with frequency, and in a manner sufficiently significant for us to conclude that it bears the relation of cause and effect?

3. Is the general paresis which is due to syphilis to be distinguished from the nonspecific form by any clinical or anatomical characteristics?

The responses to these questions may be summed up as follows: The symptoms—complex—of general paresis (psychic and motor phenomena) are due to a diffuse primary peri-encephalitis, which produces a cortical cerebral disorder corresponding to extensive chronic progressive lesions. The nature of these lesions makes little difference. Any extensive progressive alterations of the cortical cerebral system will simulate in various degrees of resemblance general paralysis. Thus syphilis, when it produces cortical or deeper lesions, produces a syphilomatous general paresis. This form, especially at its beginning, may be amenable to specific treatment, but the syphilitic infection may also cause a cortical meningo-cerebritis by syphilitic sclero-gummata, either diffuse or by an infiltration having a local origin. Generalised cortical meningo-encephalitis reproduces the symptoms and lesions, and may lead to the diagnosis of general paresis. Whatever may be the variety of the lesions, there is a clinical and imperfectly outlined general paralysis of syphilitic origin, which is the least curable of the forms of cerebral syphilis.

The researches of these investigators show that syphilis exists as an antecedent condition in from 60 to 80 per cent. of all cases of general paresis. Notwithstanding the appearance of this dispassionate memoir, French alienists as a class are apparently unwilling—such is the obstinacy born of preconceived opinions, even among scientific men—to budge from the position which Fournier sought to establish long ago in describing his pseudo-general paresis. At the Rouen congress the claim of 80 per cent. of syphilis to general paresis barely escaped ridicule, while a mere *ipse dixit*, without reliable statistics to back it, that the true proportion was as 9

to 560 or 1.80 per cent., was accepted with apparent approval and without a word of protest. Thus it would appear that there are fewer syphilitics among general paretics than in any other class of the insane, or, indeed, than in the general population! While opinion is thus strangly divided in France, in other countries of Europe, alienists, having established the great frequency of syphilis in connection with general paresis, are now busy determining the question whether in the majority of cases general paresis is directly or indirectly a syphilitic affection. In his article "General Paralysis" in Hirt's Treatise on Diseases of the Nervous System[1] we find it stated that aside from an inherited predisposition there is an acquired predisposition that is distinguishable from the former in that it needs no exciting cause to develop the disease, it being sufficient in itself. As we have seen in the case of locomotor ataxia, this factor is syphilis. It plays in general paresis the same predominant aetiological rôle as in locomotor ataxia. A person having become syphilitic has greater occasion to fear general paresis than he who has remained healthy; according to Réayer, the risk is sixteen or seventeen times greater. This opinion is in absolute accord with my own experience. Among 257 cases of general paresis I found 171 syphilitics,—66.50 per cent.; and among 260 patients suffering from other diseases, only 14,—5.38 per cent. It may be said that heredity and all the exciting causes combined do not produce as many cases of general paresis as syphilis alone. Albeit, the exact manner of the action of syphilis is not yet known, although, as we believe to be the case, the syphilitic alteration of the vessels must be admitted; or, it is a question of toxic action which would lead to the conception of general paresis, as in the case of locomotor ataxia, as a post-syphilitic affection;—as to the fact itself all are agreed, numerous articles on the subject attesting thereto without exception.[2]

However convincing may be the arguments against the

[1] 1890.

[2] Annales Méd.-Psych., Mars-Avril, 1891, E. Régis.

universal causation of general paresis by syphilis, it would certainly seem that the couclusion of H. C. Wood, published over seven years ago, is correct,—"That syphilis may produce a disorder whose symptoms and lesions do not differ from those of general paresis; that true general paresis is very frequent in the syphilitic; that the only perceptible difference is one of curability; that the curable sclerosis may change into and be followed by the incurable form of the disease."[1]

Dr. Mendel found that in 146 cases of general paresis, 109, or 75 per cent., had a distinct history of syphilis, while in 101 cases of various other forms of insanity only 18 per cent. had specific antecedents.[2]

Dr. Bannister, of the State Insane Hospital, Kankakee, Ill., writes me, under date of October 12, that, in analysing the cases of general paresis under his care, he finds that out of all the cases where the facts are obtainable, 72 per cent. certainly, and enough more, almost as certainly, to raise the percentage to 89 per cent., have had prior syphilis.

Quite recently Binswanger has also contributed statistical data in this same connection. Of 206 cases of general paresis in men, there was a distinct history of syphilis in 46 per cent., and in 15 per cent. there was room for doubt. Following the method of Berkeley Hill, who considers two thirds of the doubtful cases a legitimate addition to the percentage, we get a history of 57 per cent. of syphilis in Binswanger's patients. On the other hand, of 320 of his patients suffering from various other forms of insanity, he found that there were syphilitic antecedents in but 4 per cent., with 8 per cent. of doubtful cases. These striking figures have been confirmed by the experience of the Utica State Hospital.

During the past ten years there have been received at Utica 267 cases of general paresis, namely, 226 men and 46 women. Of these, 131 had a history of syphilis,—115 men and 16 women. The percentage of ascertained syphilis to

[1] New York Medical Journal, March 22, 1884.
[2] Ibid.

the total number of cases admitted was 49 per cent., which is increased to 51 per cent., if figured on the men only, on the number of male admissions. Again: If syphilis and intemperance be taken together, we find that during the same decade at Utica 68 per cent. of the cases of general paresis were ascribed to these causes, and that the percentage figured on the men only was 70 per cent.

In regard to the percentage of insanity due to syphilis in forms other than general paresis, we find that from the opening of the Utica State Hospital in 1843 until the year ending September 30, 1891, there were admitted 18,688 cases, of which 9,814 were men and 8,874 women. The percentage of syphilis to the total number admitted was 25.3 per cent.

This insignificant percentage, when taken in connection with the statistics just given as regards general paresis, is very striking. It surely disposes of any theory of mere coincidence apart from considerations of cause and effect. As a matter of routine practice, it is our custom at Utica to subject all patients suffering from general paresis to the therapeutic test of anti-syphilitic treatment; and it is often surprising to note the effect of such medication in cases where no history of syphilis could be obtained. We cannot absolutely exclude syphilis unless we can exclude infection.

Very interesting, as having a direct bearing upon this inquiry, are the recent researches of Dr. Bouchaud on the relative frequency of general paresis among the laity and clergy. France is a promising field for such an investigation, and the conclusions of this alienist are of especial value and significance. It appears that general paresis is exceedingly rare among the clergy of France, being in the proportion 2.4 per cent. as against 25.3 per cent. among the laity. Surely the explanation of these figures is on the surface, viz., that among the causes which appear to exercise the most potent influence in the production of general paresis, those whose operation is least contested,—venereal excess, syphilis, and alcoholism,—are frequently encountered among the laity, and exceptionally so among the clergy. Dr. Bouchaud sug-

gests, as an interesting way of more accurately determining other factors in causation, in addition to these three principal ones, a careful inquiry into what is abnormal in the lives of the clergy who become paretic—a task which would not be laborious in view of the relatively small number of cases to which such an inquiry would be addressed.

Insanity in its purely functional form, due to the influence of the virus on the nerve elements during the period of its greatest activity, is rare, and the subjects of it do not often find their way into hospitals for the insane. Finger made the discovery that during the roseola eruption in such cases there is an abolition of the knee-jerk, its reappearance being coincident with the abatement of the fever. In this connection Spitzka has called attention to the profound effect of the virus upon the nervous structure, suggesting the analogy of the febrile delirium in scarlet-fever and measles.[1]

Brush, of Baltimore, had also noted independently the abolition of the knee-jerk under similar circumstances.

Intemperance.

There are few subjects on which it is easier to obtain conflicting data than those referring to the use and abuse of alcohol. The fact is, that we are prone, as medical men, to view this great social and economic question from the individual stand-point, and indisposed to think ill of an indulgence to which we are ourselves accustomed, or, conversely, to attribute to alcohol all the ills to which flesh is heir if we happen to be ourselves total abstainers. As an extraordinary instance of this alternative attitude, I might cite the conference held not long ago on Staten Island, at which some of our brethren openly conspired to bring John Barleycorn into public contempt. But that alcoholic excess is either directly or indirectly one of the commonest, if not the commonest, of all causes of insanity will scarcely be denied by any who have had experience with the insane.

[1] Proceedings of the Psychological Section of the International Medical Congress, 1887.

We have, first of all, to deal with the hereditary influence of alcoholic indulgence upon the production of insanity, which is itself a tremendous factor in causation. This branch of the subject alone, which has been treated somewhat extensively by Dr. Hurd,[1] would, if discussed here, involve disregard of the injunction to brevity that has been laid upon me.

It is difficult to avoid the conclusion that the confirmed drunkenness of the parent is as potent as is actual mental disease or mental deficiency to predispose his children to the development of insanity in their turn. In fact, as Dr. Hurd has clearly pointed out, drunkenness is a transient insanity. Its early stage of exhilaration and mental excitement, its later one of delirium and mental aberration, and its last stage of stupour and profound insensibility, all correspond to similar stages in attacks of insanity. The inebriate in his debauch passes in a few hours through a psychical disturbance which differs in no respect from an attack of any one of the forms of insanity, except in its duration. Examples of the transmission of this transitory mental aberration from parents to children are, unfortunately, too common. Every public institution for the care of the defective and dependent classes shelters persons whose mental organism has been defective from birth by reason of the sins of the fathers that have been visited upon them in tainted heritage to the third and fourth generations. It is a fact, too, that some other influence may cause drink craving and madness as concomitant results, and, further, that drink may concur and continue with other causes to produce a progressive effect the end of which is the evolution of madness.[2]

Intemperance, then, is often assigned as the cause of mental disorder, when it is in reality only a premonitory symptom. The distinction between the two may be briefly stated thus: When alcohol is the cause, the previous habits of the patient have been those of the drunkard, while, when it is to be regarded as a symptom, the patient has lived a life of

[1] Sanitary Convention, Pontiac, February, 1883.
[2] See Bucknill.

comparative sobriety. In cases where it may be properly regarded as a cause, no other influence can be detected which has produced the insanity, or the evidence is so marked as to swamp all other aetiological considerations. Intemperance as a symptom, on the other hand, only appears in cases where some other distinct influence can be traced which would be more likely to produce insanity than drink. Moreover, cases might easily be cited in support of the proposition that the mental symptoms differ in the two classes. Insanity that is the direct result of intemperance is generally associated with systematised delusions and hallucinations of a persecutory character, frequently rendering the patient dangerous to himself and to others. This is not apt to be the case where we have insanity as a symptom of intemperance.

Without attempting to go into the pathology of the changes wrought by alcohol, it may be stated in simple terms that it exercises the same degrading influence on the brain tissue as it does elsewhere, changing organic constitution and impairing function. It first excites, then paralyses, every nerve centre in succession, beginning with the highest and ending with the lowest, and the highest inhibitory and controlling centres upon which its primary action is exercised cannot be subjected to repeated paralysing influences without seriously jeopardising or compromising the patient's mental integrity.

One cannot enter upon discussion of the disease theory of intemperance without treading upon dangerous ground; but even those of us who have least sympathy with the extreme views on this subject, and have had under treatment men who are "generally rather proud of their position and feel themselves interesting subjects of psychological inquiry," will frankly concede the impaired inhibitory power of all drunkards, and recognise in their total disregard of consequences a sign of disease, and, at least, an analogy to actual insanity.

As regards statistics, a few years ago an ex parte pamphlet was issued by the United States Brewers' Association, giving the results of an extensive statistical inquiry as to the impor-

tance of alcoholic intemperance as a factor in the causation of insanity. It may be presumed that the intended object of the inquiry was to sing the praises of beer by a proclamation of its relative innocuousness as such factor. A Mr. Thomann, who thus championed the cause of the Brewers' Association, deduced from the figures he obtained from about eighty institutions that only about 7 per cent. of insanity in America was due to alcoholic excesses. The very fact that there is such a wide divergence of opinion as to the causative value of intemperance, as shown in these statistics, where apparently the insane were drawn from the same classes of society and subjected to the same influences, would seem to suggest untrustworthiness. It is difficult, for instance, to understand why in these tables the percentage should be 25 per cent. at Mt. Pleasant, Ia., and 2 per cent. at Independence, in the same state. Here there was manifestly some error committed.

Dr. Bannister, of the Kankakee asylum, went over much the same ground as Mr. Thomann, for the purpose of verifying his figures and established a higher percentage. It must not be forgotten that a certain number of cases come to insane asylums absolutely without any history, and in such of them as draw their inmates from a large city like New York, this number forms a very considerable proportion of the whole number received. In a careful table prepared by Dr. Bannister, in nineteen out of twenty-four asylums the average percentage of admissions due to causes unknown is a little over 25, and in most of these the alleged causes only were given. Thus, it is possible, and, indeed, probable, that the ratio of insanity from drink is as great amongst the cases whose history is unknown as it is amongst those in regard to whom we have the facts, and this should always be considered when we estimate its relative frequency in the whole number of cases. Thus, if ascertained data on only 50 per cent. of cases give a ratio of 10 per cent. on the whole, then it appears probable that complete information might give 20 per cent. on the whole; and if we only knew the facts in

regard to 75 per cent., and find from these a ratio of 9 to the hundred on the whole number, it is somewhat presumable that full data would yield us a ratio of 12 per cent.

As regards the statistics of the Utica State Hospital, I find that of 18,688 cases admitted since the opening of the institution until September 30, 1891, intemperance was assigned as a cause in 1,357 cases—1,223 men, 134 women—making a percentage of 7.26 per cent. It is safe to say, however, that a fuller knowledge of the histories of these patients would measurably increase the proportion, especially as cases of general paresis are not included in this estimate. I have already stated that at Utica syphilis and intemperance appear in associated causation in 70 per cent. of our male cases of general paresis.

Taking the reports of thirty-three asylums, situated in various parts of the country, for the year 1890, I find the percentage of insanity due to intemperance, figured on the number of admissions, to be 6.99 per cent. Of these institutions, the highest ratio, 24.57 per cent., is found at the Hudson River State Hospital, and the lowest, 15 per cent.,—which is very difficult to explain,—at the State asylum for insane criminals at Auburn. An examination of a table thus prepared, and which I shall not weary you by reading, suggests such a varying prevalence of intemperance as a cause throughout the country as to render one chary of accepting the figures without considerable allowance.

To the credit of America be it said, the proportion of insanity among us attributable to intemperance is much lower than in Europe. Thus, it appears from the annual report of the Lower Austrian public asylums[1] for 1888, that at the Vienna institution, which received 830 patients during the year, alcoholism was considered the exclusive cause of insanity in 143 men and 11 women, and a contributing cause in 93 men and 13 women, 45 per cent. of the male admissions being due, therefore, wholly, or in part, to alcoholic excesses. As Vienna is situated in a wine-growing country, and its beer

[1] Vienna, Ybbs, Klostanenberg, and the branch asylum of Gugging-Kierling.

has a world-wide reputation, this would not seem to lend much support to the views of those who think an abundant supply of fermented liquors conducive to temperance.

In Paris, during the years 1887–1889, 8,139 persons have been found insane at the hospital station of the prefecture of police. Of these, alcoholism was considered to be the cause of insanity in 2,982 cases, or about 37 per cent. The number of cases of alcoholism in Paris has increased 25 per cent. in the last three years, and has doubled in fifteen. This increase is due, no doubt, in a great measure to the development of a new industry, that of *Bouilleurs de cru,* who have inundated the country with their toxic products. There are said to be now more than 500,000 of these manufacturers, whose products are subjected to no serious control. There can be no doubt that the virulence of the poison is in inverse ratio to the purity of the alcoholic product, in stating which proposition one might well reverse the sentiment attributed, with what justice I am not able to say, to a distinguished scource, that "all whiskey is good, though some kinds are better than others." This fact seems to be borne out by the statistics of British asylums, which draw their patients from large towns in which the curse of excessive spirit drinking prevails to an enormous extent. Thus, at Prestwich, near Manchester, the percentage of insanity assigned to intemperance is 19.38 per cent., while the average of nine British asylums, taken at random from the reports of last year, is 12.86 per cent. It is interesting, though somewhat doleful, to note that emigrants to New South Wales apparently carry their habits of intemperance with them, the latest report of the inspector for New South Wales showing that in all the hospitals and licensed houses the ratio of insanity attributable to intemperance is about the same as in England, namely, 12.77 per cent.

Statistics of Utica State Hospital.

During the past ten years there have been received into the Utica State Hospital 267 cases of paresis—41 women and 226 men. Of these, 131 were due to, or had a history of, syphilis—16 women and 115 men; 49 to intemperance directly—6 women and 43 men; and other causes, including "unascertained," were assigned in 87 cases—19 women and 68 men.

Of those who had syphilis, 66—3 women and 63 men—had *a history also of intemperance.*

The percentage of syphilis to women admitted in the female cases was 39 per cent.; intemperance, 15 per cent.; and other causes, 46 per cent.

The percentage of syphilis to men admitted in the male cases was 51 per cent.; intemperance, 19 per cent.; and other causes, 30 per cent.

The percentage of syphilis to total cases admitted was 49 per cent.; intemperance, 19 per cent.; and other causes, 32 per cent.

Of the total cases, 68 per cent. were due to syphilis and intemperance.

Of the female cases, 54 per cent. were due to syphilis and intemperance.

Of the male cases, 70 per cent. were due to syphilis and intemperance.

From 1850 to September 30, 1891, the proportion of cases of general paresis to total admissions was 4.60 per cent. There were admitted 15,946 cases, and of these 735 had general paresis—women, 82; men, 653.

From the opening of the Utica State Hospital until the year ending September 30, 1891, there were admitted 18,688 cases, of which there were 9,814 men and 8,874 women. During the same period, intemperance was given as a cause in 1,357 cases. Of these, there were 1,223 men and 134 women. The percentage of intemperance to total number admitted was 7.26 per cent. The percentage of men to total cases admitted was 6.54 per cent. The percentage of women to total number admitted was .72 per cent. The percentage of men to the total number of men admitted was 12.46 per cent.; the percentage of women to total number of women admitted was 1.51 per cent.

During this same period, syphilis was given as a cause in 98 cases, 84 of which were men and 14 women. The percentage of syphilis to total number admitted was .52 per cent. The percentage of men to total admissions was .445 per cent. The percentage of women to total admissions was .075 per cent. The percentage of men to total number of men admitted was .85 per cent. The percentage of women to total number of women admitted was .15 per cent.

SUMMARY.

	SYPHILIS.						INTEMPERANCE.			
	Men	Women	Total				Men	Women	Total	Admitted
				Dr. Brigham's adminis'n			82	5	87	2,376
				Dr. Benedict's adminis'n			106	8	114	1,547
	2		2	Dr. Gray's to Dec., 1866			306	13	319	4,056
	13	1	14	Dr. Gray's 1866 to 1874			223	26	249	3,420
	—	—	—	Men	Women	Total	—	—	—	—
	15	1	16	5,955	5,444	11,399	717	52	769	11,399
1875				225	207	432	43	6	49	
1876		1	1	223	213	436	33	2	35	
1877	4		4	234	226	460	30	5	35	
1878	3		3	234	193	427	20	5	25	
1879	3	1	4	215	203	418	27	1	28	
1880	3	2	5	247	221	468	27	2	29	
1881	4	1	5	212	199	411	25	4	29	
1882	4		4	206	206	412	28	4	32	
1883	6	3	9	218	186	404	36	2	38	
1884	5	1	6	201	186	387	16	4	20	
1885	9		9	203	189	392	33	6	39	
1886	3	2	5	235	195	430	28	4	32	
1887	4		4	205	169	374	23	4	27	
1888	2	1	3	254	190	444	39	9	48	
1889	2		2	249	217	466	36	6	42	
1890	8		8	270	237	507	36	10	46	
1891	9	1	10	228	193	421	26	8	34	
	84	14	98	9,814	8,874	18,688	1,223	134	1,357	

AMERICAN HOSPITALS.

INTEMPERANCE AS CAUSE.

Hospital.	Admissions during 1890.	Men.	Women.	Total.	Percentage on total admitted.
Little Rock, Ark.	88	1	. . .	1	.11
Agnews, Cal.	389	14	5	19	4.89
Napa, Cal.	401	18	3	21	5.24
Connecticut	368	35	7	42	11.44
North Dakota	181	10	6	16	8.84
Georgia (Whites)	267	. . .	. . .	8	2.99
Illinois, Southern	278	7	. . .	7	2.52
Central Indiana	664	20	1	21	3.16
Kansas (Osawatomie)	247	6	. . .	6	2.43
Kansas (Topeka)	526	20	. . .	20	3.84
Maine	253	19	1	20	7.9
Danvers, Mass.	378	38	15	53	14.02
Westboro', Mass.	310	12	5	17	5.48
McLean, Mass.	123	5	. . .	5	4.07
Worcester, Mass.	412	53	11	64	15.53
Worcester, Mass. (chronic)	45	3	1	4	8.89
Eastern Michigan	378	43	2	45	11.9
Nevada	64	7	. . .	7	10.94
Utica, N. Y.	507	35	8	43	8.48
Auburn, N. Y. (criminal)	65	1	. . .	1	.15
Hudson River, N. Y.	407	88	12	100	24.57
Athens, O.	229	14	1	15	6.55
Dayton, O.	196	3	. . .	3	1.53
Cleveland, O.	284	16	3	19	6.7
Philadelphia, Pa.	283	38	12	50	17.67
Pennsylvania	178	6	1	7	3.9
Warren, Pa.	219	14	1	15	6.85
West Pennsylvania	256	17	2	19	7.42
Harrisburg, Pa.	188	3	1	4	2.13
North Texas	264	11	. . .	11	4.17
South-western Va.	125	4	1	5	4.
Western Va.	125	2	. . .	2	1.6
West Washington	258	27	1	28	10.9
Totals	8,956			698	230.81

230.81 ÷ 33 = 6.99.

AMERICAN HOSPITALS.

Syphilis as Cause.

Hospital.	Admission during 1890.	Men.	Women.	Total.	Percentage on total admitted.
Agnews, Cal.	389	3	. . .	3	.8
Napa, Cal.	401	. . .	1	1	.4
Connecticut	368	2	1	3	.8
Georgia (colored)	136	. . .	. . .	3	2.1
Illinois, Southern	278	2	. . .	2	.8
Central Indiana	664	8	. . .	6	.9
Kansas (Osawatomie)	247	2	. . .	2	.8
Danvers, Mass.	378	3	. . .	3	.8
Worcester, Mass.	412	1	1	2	.5
Eastern Michigan	378	2	4	6	1.6
Nevada	64	1	. . .	1	.15
Utica, N. Y.	507	8	. . .	8	1.6
Auburn, N. Y. (criminal)	65	1	. . .	1	.15
Hudson River, N. Y.	407	4	. . .	4	.9
Athens, O.	229	6	. . .	6	2.61
Dayton, O.	196	. . .	1	1	.5
Warren, Pa.	219	1	. . .	1	.5
Western Pennsylvania	256	3	. . .	3	1.17
Harrisburg, Pa.	188	12	. . .	12	6.38
North Texas	264	2	3	5	1.9
South-western Virginia	125	1	1	2	1.6
Western Virginia	125	1	. . .	1	.8
Western Washington	258	3	1	4	1.6
Totals	6,554			82	29.36

$29.36 \div 23 = 1.28.$

FOREIGN HOSPITALS.

Intemperance as Cause.

Hospitals.	Total admissions.	Men.	Women.	Total.	Percentage on total admitted.
New South Wales (all hospitals and licensed houses)	556	51	20	71	12.77
Kirklands Asylum (Scotland)	85	10	4	14	16.47
Barnwood House	25	3	1	4	16.
Prestwich	841	115	48	163	19.38
Cumberland and Westmoreland	150	17	1	18	12.
Dundee	140	19	6	25	17.85
Perth	25	1	. . .	1	4.
Roxburgh	56	3	3	6	10.71
Leicester	155	8	12	20	12.9
Worcester	201	10	3	13	6.4
Total	2,234			335	128.48

Average per cent.—128.48 ÷ 10 = 12.85.

Syphilis as Cause.

New South Wales (all hospitals and licensed houses)	556	3	. . .	3	.54
Kirklands Asylum (Scotland)	85	1	. . .	1	.12
Barnwood House	25	1	. . .	1	4.
Prestwich	841	. . .	2	2	.23
Cumberland and Westmoreland	150	1	1	2	1.33
Dundee	140	1	1	2	1.43
Gloucester	292	1	. . .	1	.34
Total	2,089			12	7.99

Average per cent.—7.99 ÷ 7 = 1.14.

CAUSES OF INSANITY PECULIAR TO WOMEN.

By W. D. Granger, M. D., of Westchester County.

Reversing the usual rule, I shall state my conclusions first. These are, that as to the causes of insanity peculiar to women the following propositions are true:

1. That men and women suffer almost equally from insanity, and from the same forms of the disease,—mania, melancholia, dementia, and even paresis. These, in all their various modifications, are common to each sex.

2. That sex modifies somewhat the disease, as do individual peculiarities, age, and cause.

3. That the general causes of insanity are the same in men and women.

4. That special conditions peculiar to each sex occupy a narrow field in the total causation of insanity.

5. That the general causes are always more or less in operation at times when special causes operate, and at all other times as well.

6. That causes peculiar to women, namely, the climacteric periods, pregnancy, childbirth, prolonged lactation, uterine diseases, and menstrual irregularities, are to be found, one or more, in almost every woman;—yet but few suffer from insanity thereby.

7. That these conditions being present, it must not be assumed that they caused insanity in any given case, for other causes, viz., the general causes, must first be eliminated; and if this careful study is made, it will often be found that these general causes are in active operation, and the special cause was only one of many conditions operating to produce the insanity, or the last straw, so to speak.

8. That special causes operate in essentially the same way as do general causes. They produce anaemia, malnutrition,

general ill health, shock, loss of blood, loss of sleep, anxiety, worry, and the other recognised general conditions favourable to insanity.

9. That these special causes, being more or less common to all women and producing insanity in only comparatively few cases, produce it largely when there is a predisposition to insanity; and in this, again, they act exactly like general causes.

10. That diseases of the uterus and ovaries, disorders of menstruation and puberty, produce but a very small proportion of those cases of insanity caused by conditions peculiar to women; that pregnancy, childbirth, prolonged lactation, and that period known as change of life, give by far a majority of the cases, but all these causes combined produce but a small proportion of insanity in women; that different observers report very different totals from these causes; and that it is a question by no means easy to decide, whether these causes operate so as to increase insanity in women as contrasted with men.

11. That treatment and cure of pelvic diseases in women who are insane have not resulted in that improvement of the mental condition that was expected and earnestly hoped for, —in fact, as curative measures they have been largely failures; that menstrual irregularities have much less influence upon a case of insanity than was formerly supposed to be true; that many insane women are better when they do not menstruate; and when the function is normally reëstablished, there is frequently an increase of the mental disturbance.

12. That the study of the causation of insanity is an extremely complex one, and that the study of causes peculiar to women does not always help to elucidate, but, rather, to complicate, the problem.

13. That the frequency of diseases and conditions peculiar to women, as causes of insanity, has been and is now greatly exaggerated in the mind of the laity and the general practitioner; that it is taking its truer place among gynaecologists, neurologists, and alienists.

I would call your attention to the fact that the general practitioner is constantly carrying girls through puberty and women through change of life, treating menstrual irregularities, uterine and ovarian diseases, and caring for confinements, without a thought that the patient so suffering will become insane; but if one of these many patients does become insane, it is too often attributed to the special cause, while general causes are entirely overlooked. To do so is unscientific, and indicates ignorance.

15. That alienists have exaggerated the influence of causes peculiar to women in producing types—understand, not forms —of mental disease. It is equally true that there is a reaction in this particular.

It is impossible for me, in the time at my disposal, to defend all these propositions. Many are self-evident. Some would meet with decided opposition by some of my specialist friends, who may be better able than I to draw correct conclusions.

In quoting statistics, I would say that I have selected them, for fairness, at random. For English asylum reports I take that of the English Lunacy Commission for 1883, representing over 30,000 cases, and 7,000 admissions of women during that year. Of American asylums, I choose from a pile of a dozen reports representing different sections of the country; also the last report of the Commission in Lunacy of the state of New York, 1891.

Every one within my hearing knows the close relationship between uterine physiological action and the nervous system, and between diseases of these organs and diseases of the nervous system. Certainly puberty and adolescence excite the nervous system, depress or excite the emotions, and affect the general health. Pregnancy and childbirth and lactation are always a physical strain, telling upon the nervous system.

Call to mind some of the conditions of pregnancy,—the mental impression, the cessation of menstruation, the growth of child and uterus, displacement of abdominal organs, the changes in the breasts, alteration of the blood, loss of appe-

tite, nausea and vomiting, the birth of the child with its mental anxiety, pain, loss of sleep and loss of blood, the activity of the lacteal glands, the broken sleep from nursing and care of child, and the involution of the uterus. When we consider these coarser and more obvious conditions only, the wonder is that so few break down and become insane; and it speaks well for the mental stamina of women that they so nobly bear a burden that men are free from.

It is not strange that the normal function of the organs peculiar to women, and more especially their diseased conditions, should be popularly supposed to be very productive of insanity; but popular medical supposition has absolutely no place in medicine. These conditions do produce insanity: the question is, How, and to what extent?

Take childbirth, for example. Is it the purely physical conditions that cause the insanity,—the rapid emptying of the uterus, its rapid involution and the drain upon the nervous system, the exhausting discharge, the setting up of the glandular activity of the breast? or is it the pain, the loss of blood, the loss of sleep, the mental anxiety, the care of the new born and its nursing, and broken nights? or is it, as is too often the case, continued household cares, care of other young children, neglect of the husband, or drunkenness and brutality on his part? Is it general anaemia, malnutrition, imperfect oxidation? or is it due partly or largely to general causes? Study your cases, and see when all these operate, and your patient comes almost to the point of death, and yet no insanity follows, and then find out the relation of cause and effect, when, with easy labour, with every comfort and assistance, and without mental worry, you get a case of puerperal mania. Of course, it is true, insanity does more often follow severe labour, great loss of blood, instrumental interference of any kind, or when associated with disease of the kidneys, with anaemia, and with general ill health; but exceptions are very numerous. Perhaps the answer will be, It was predisposition that caused it. If you study your cases, and pick out those supposed to be predisposed, you

will be surprised at the relative frequency of insanity among those supposed to be free from taint. In considering your cases of puerperal insanity, do not neglect to give full value to all other causes, common to men and women, that may be present. It but proves that the interesting study of causes of insanity peculiar to women tends to confuse rather than to elucidate the complex question of general causation. Here, it throws light; there, it obscures.

Upon the influence of pelvic disease in causing insanity in women, I would quote from Dr. Margaret A. Cleaves, in the July number of the *Journal of Nervous and Mental Diseases*, whose experience as an alienist and gynaecologist entitles her opinion to respect. She is reviewing a paper by Dr. J. S. Stone, entitled "Can the Gynaecologist aid the Alienist in Institutions for the Insane?" In that paper Dr. Stone took too decided, and, I think, indefensible, grounds in the affirmative. Dr. Cleaves properly advocated a more extended treatment of pelvic diseases than has heretofore been generally done; but she wisely says,—"Insanity is quite as often, if not more often, abdominal, rather than pelvic, in its origin; and a better practice, in the way of regimen and diet, based upon a better knowledge of digestion, assimilation, and oxidation, in relation to health and disease, would bring about more startling results in the treatment of the insane than would gynaecological treatment." And again, speaking of the views of alienists as opposed to gynaecologists, she says,—"Whether the position of the alienists, as set forth by Dr. Stone,—namely, supposed opposition to special treatment of pelvic diseased organs in women,—is due to the fact that he, the alienist, recognises in women other organs than the reproductive ones, we do not know. In a way, the possibility is rather refreshing in contrast to the tendency to regard the ill health of sane women as largely due to pelvic diseases."

As to frequency, she thinks about the same proportion of pelvic diseases occur in sane and insane women. As to special treatment and its results, she fully believes in its necessity, but says, in qualification, "As to the result being an

increased number of recoveries, we doubt." She wisely recognises that healthy pelvic organs, like healthy organs in any part of the body, conduce to the "highest physical tone," and so "the best mental results are to be hoped for." Of course the question of treatment has no place in this paper, except as a side light upon cause.

It is from asylum reports only that we can get reliable statistics regarding insanity, though they are by no means perfect, and are always tempered by the person making them.

First, to consider the number admitted to asylums whose insanity is attributed to causes peculiar to women.

In 1883, there were admitted to all asylums in England and Wales 7,441 women. Of these, insanity was attributed to,—

Pregnancy in 52 cases, or .7 of 1 per cent.;

Parturition and the puerperal state in 485 cases, or 6.5 of 1 per cent.;

Lactation in 161 cases, or 2.2 of 1 per cent.;

Uterine and ovarian disorders (including, I suppose, menstrual disorders) in 176 cases, or 2.4 of 1 per cent.;

Puberty in 36 cases, or .5 of 1 per cent.;

Change of life in 219 cases, or 3.9 of 1 per cent.;

or a total of 1,201, or about 16 per cent. of all admitted—a large proportion, certainly, and, taken in the aggregate, exceeded by no one special cause.

Pregnancy proper gives but few cases—.7 of 1 per cent. only; but the parturition and puerperal state gives by far the most cases, being 6.5 per cent.; lactation and uterine ovarian diseases but a trifle over 2 per cent. each, puberty, .5 of one per cent., and change of life, 3.9 per cent. The proportionate number of women insane from parturition is not only actually but relatively very large, for, including those classed under pregnancy numbering 52, and lactation numbering 161, it gives a total of 698, or considerably over one half of all cases now considered, due to child-bearing. There were about 4,256,000 unmarried women in England in 1881, more than fifteen years of age, and more than 4,400,000 married;

but, of course, only a part of the married were pregnant,—and if we include the illegitimates, it still raises the proportionate number of insane from child-bearing as compared with other causes. Yet, relatively to the whole number of women in England, all these figures of causation sink into insignificance. Think of it: out of 8,600,000 women over fifteen years, in England, but 698 entered asylums from the child-bearing condition, in an entire year!

How small the influence of uterine and ovarian diseases, when a total of over 8,000,000 women gives but 176 cases of insanity admitted to all the asylums in England in one year from this cause!

There was a total of 2,173,000 women in England between forty-five and fifty-five years, by the census of 1881; and yet in one year but 219 were admitted to asylums, where, directly or indirectly, change of life could be attributed as a cause.

Most women live in dread of this period, and many, very many, fear insanity. To be sure, it does give quite a large number of insane from this special cause; and yet how insignificant as compared with the total number of women passing through this change. As a bug-a-boo, it is almost equal to the alarm over hydrophobia and small-pox.

To be sure, all cases of insanity do not enter asylums, but a majority do; and of those who do not recover at home, a very large majority eventually enter institutions for the insane.

Turn to American reports. In one asylum, with 721 women admitted, ovarian disease caused 10 cases; puerperal (including child-bearing and lactation), 46; uterine disease, 3. In this asylum are two women physicians.

In another, with 271 admissions, childbirth caused 3; lactation, 6; puerperal state, 4. No cases in either due to change of life.

In another asylum, with 4,462 women admitted since its opening, 345 cases are charged to the puerperal state; 3 to uterine diseases; 15 to prolonged lactation; 7 to menstrual derangements; and only 11 to the menopause. This gives a

total of only 381 in 4,462 cases due to causes peculiar to women.

In another, with 284 women admitted, we have,—change of life, 1 case; female disease, 1; frequent child-bearing, 1; menstrual troubles, 1; parturition, 1; pregnancy, 1; puerperal condition, 1; suppression of menses, 1.

In another asylum, with 237 admissions, we have reported,—puerperal (including childbirth and abortion), 11; prolonged lactation, 3; menopause, 17; menstrual irregularities, 3; uterine diseases, 6. This asylum has a woman physician.

In still another, with 144 admissions, we have as causes,—menstrual irregularities, 2; prolonged lactation, 1; abortion, 1; menopause, 1; pubescence, 1; puerperal, 13. This asylum also has a woman physician.

In another, with a total of 1,021 women admitted, childbirth caused 2 cases; disordered menses, 20; menopause, 17; puerperal, 69; uterine trouble, 13,—or a total of 121 cases caused by conditions peculiar to women, out of a total of 1,021.

In these American reports puerperal cases constitute by far the largest number. In some reports menopause is not mentioned; in only one did it exceed the puerperal, where 17 of menopause and 11 of puerperal are reported.

In one of the best known asylums in the country, 345 cases are reported as puerperal, and but 11 from the menopause.

Observe how few are attributed to uterine disorders, how few to menstrual disorders, and how few to pubescence; and also observe the almost entire absence of suppressed menstruation as a cause of insanity.

Without going into elaborate comparisons between English and American statistics, we can in a general way say that they show essentially the same drift of opinion in the minds of superintendents of both countries upon the question of diseases and conditions peculiar to women as a cause of insanity. It should not be understood that asylum men fail to recognise the existence of uterine or ovarian diseases, or fail

to find "irregularities of menstruation, or fail to appreciate when their patients are passing through the pubescence or the climacteric." It is that they are not able to connect closely enough these conditions as a cause of the insanity. It may be but a contributing cause; or perhaps the real cause is of a general rather than a special character.

Probably many cases with some female weakness are put down under "general ill health" as a cause, the female weakness being but one of many causes of the ill health; or the case goes into the large class of "unknown causes." Puerperal mania is the greatest single cause, because the relation between the puerperal state and the insanity is so close as to be in most cases easily traced and convincing. But this is by no means so true in uterine and ovarian disorders and menstrual irregularities. Adolescence secures few cases in the reports, because this period of life is not prolific of insanity, nor is the condition active as a cause.

Change of life gets a larger percentage, being next to puerperal causes. This it deserves, for it does cause a fair proportion of cases. As we saw in the English report, about 3½ per cent. of all admitted into asylums are attributed to this cause. It is, however, not so clearly traced as are puerperal causes, and, in my opinion, is too often carelessly assigned as the only cause. Almost every case of insanity—especially melancholia—that comes between thirty-five and sixty years in women is supposed, in the popular mind, and often by the physician, to be caused by change of life. But the so called general causes—those common to each sex—are quite active during these years, and produce by far the large majority of cases of insanity among women. In England, in 1883, 1,744 women between the ages of thirty-five and forty-five, and 1,253 between forty-five and fifty-five, were admitted to asylums, making a total of 2,997. Of this number 291 only were attributed to change of life. It would take too long to prove that causes peculiar to women probably do not increase the proportionate number of women admitted to asylums compared with men.

To sum up briefly, I would quote from the English Lunacy Commission report of 1883. Table 17 gives the ratio (per every 10,000) of persons admitted to all English asylums to the whole population, arranged according to ages and condition as to marriage. In almost every comparison the males exceeded the females in each 10,000. Take, for instance, the age from forty-five to fifty-five, the time of change of life,—single males admitted to each 10,000, 22.4, females 23.8; married male 9.1, female 8.4; widowed—males 15.8, females 12.4. From fifty-five to sixty-five the males exceeded the females in every instance, and this was also true in the large majority of comparisons during the entire child-bearing period.

In closing, I would call attention to some of my opening conclusions:

1. That men and women suffer almost equally from insanity.

2. That sex modifies somewhat the manifestations of the disease.

3. That the general causes of insanity are the same in men and women.

5. That these general causes are always in operation, at times when special causes operate, and at all other times as well.

6. That most women suffer from diseases peculiar to their sex, and but few suffer from insanity thereby.

7. That even if special causes are present, their causative action must not be assumed in any given case without some proof, and without considering all general causes that may be present.

8. Special causes act in essentially the same way as do general causes.

11. That special treatment and cure of conditions and diseases peculiar to women, especially uterine disorders, has not resulted in the cure of insanity to the extent that was hoped for and expected; that so far as the cure of these diseases restores the general health, we get the best results

in treating mental disorders, and that this statement is equally true of diseases of other organs of the body, and of the cure of general ill health.

13. That conditions and diseases peculiar to women, as causes of insanity, have been greatly exaggerated.

In conclusion, I would call attention to the great truth that each case of insanity must receive its own study and be individualised; that in this and in no other way can the cause be ascertained, and that it is the same when considering general and special causes.

TUMORS OF THE ORBIT SECONDARY OR CONSECUTIVE TO TUMORS OF THE NEIGHBOURING BONY CAVITIES.

By Charles Stedman Bull, M. D., of New York County.

October 29, 1891.

In considering the subject of tumors involving the orbit, it is important to distinguish between those tumors which originate in the orbit, either in the orbital tissue itself, the sheath of the optic nerve, or the periosteum of the bony walls, and those which arise in some one of the neighbouring bony cavities, and which involve the orbit secondarily. This distinction is important, not only from the diagnostic standpoint, but also from the side of surgical interference, for the location and extent of a growth involving the orbit frequently decide not only the question of an operation, but also the nature and extent of the operation itself. Many of the so called orbital tumors arise in the ethmoid cells, the sphenoid antrum, the frontal sinus, the naso-pharynx, or the maxillary antrum. It is a well known fact that tumors of the bones of the skull, or of the sinuses contained within these bones, may, and generally do, extend in every direction, from one sinus or labyrinth to another, and often exist for a long time, and reach a large size, before appearing in the orbit.

The growth of these tumors is generally slow and insidious, though occasionally it is exceedingly rapid. A very extensive disintegration of the ethmoid, sphenoid, and maxillary bones, from tumors starting in their respective sinuses, may have already occurred before the presence of such a growth is manifested in the orbit by the usual signs of protrusion or displacement of the eyeball, pain on pressure along the orbital walls or directly backwards, and the visible

or tangible presence of the growth itself within the orbit. These tumors, in the literal, narrow sense of swellings, may be either fluid or solid. The former almost always arise in the frontal sinuses or ethmoid cells, and contain pus or mucus. The latter are either solid or densely gelatinous, are always malignant in character, and arise in the maxillary, sphenoid, or ethmoid antra. Finally, a by no means uncommon growth in this locality is a bony tumor, or a real ivory exostosis, arising from the bony walls surrounding the orbit. A brief glance at the anatomical relationship of the bones at the base of the skull will enable us to understand more clearly the nature of these growths, and the important relations they bear to the cavity of the orbit and its contents.

The frontal sinuses are situated within the frontal bone at the level of the nasal boss of that bone, just above the root of the nose. They are usually two in number, separated by a more or less complete partition of bone, which is generally, though not always, in the median line. Their dimensions are very variable, but their size usually increases with the age of the patient. Their form is very irregular. The anterior wall is thickest, while the cranial and orbital walls consist mainly of compact bony tissue, with a thin layer of cancellous tissue in the centre. Each frontal sinus opens into the infundibulum of the ethmoid by a canal in the anterior cells of this bone, and is called the frontal or fronto-nasal canal. Each sinus is lined by a thin, smooth, rosy, mucous membrane, slightly adherent to the bone, and consisting of two layers, one mucous, the other periosteal.

The most frequent diseases met with in the frontal sinus are, first, mucocele, or a collection of mucus, and, second, abscess, or empyema. Empyema, or abscess of the frontal sinus, is usually an affection of adult life, though it is met with most frequently between the ages of twenty-five and thirty. It does not occur in childhood, as the sinuses are not developed to any extent at this period of life. It is found oftener among men than among women, and this is probably due to anatomical peculiarities, such as the follow-

ing: The sinuses are much more developed in men than in women; the infundibulum is wider, and communicates more directly with the nasal fossae, and through the latter with the external air; hence, infectious agents may more easily enter them. The left frontal sinus is more frequently attacked than the right, and the cause of this is as yet unknown. It is not uncommon to find, at the time of operation, that the suppurative process began in one sinus, perforated the bony septum, and involved the other sinus secondarily.

The aetiology of suppuration of the frontal sinuses is somewhat obscure. It has been attributed to tuberculosis and syphilis; but this is not strictly correct. Both these constitutional affections may produce an osteo-periostitis of the frontal bone, accompanied or followed by extensive caries or necrosis and profuse suppuration, and the frontal sinus may be invaded by the pus, but always in the direction from without inwards. The same argument applies to erysipelas, though here it must be admitted that the diseased process might extend through the mucous membrane of the nasal fossae to the infundibulum, and thence to the frontal sinus. The sinuses have also been known to suppurate during the decline and convalescence of scarlatina and typhoid fever, and during a severe attack of influenza. Wounds of the superior orbital margin may possibly produce abscess of the sinuses, but only after a long lapse of time, the diseased process extending gradually through the bone. Foreign bodies, whether inert or alive, on entering the nasal meatus and penetrating to the sinus, may set up a chronic suppurative process. Inflammatory lesions of the mucous membrane of the nasal fossae are found to exist in many cases of abscess of the frontal sinus. Finally, polypi of the nasal fossae have been known to precede the development of abscess of the sinus.

All these are, of course, mainly predisposing causes. In order that suppuration should occur in a frontal sinus, there must be an entrance and proliferation of pyogenous microbes

in the cavity of the sinus. The latter may penetrate directly into the sinus without infecting the nasal fossae, or the suppuration of the sinus may be induced by that of the nasal fossae. In the latter case, infection of the sinus may occur through the frontal canal or infundibulum, or by way of the lymphatics. Once invaded by the microbes, the mucous membrane of the sinus swells and becomes thicker, and thus the canal of the infundibulum is narrowed and eventually obliterated. Then the pus begins to accumulate in the sinus. In simple catarrh of the sinus, the infundibulum becomes closed; but here the result is an accumulation of mucus, and not of pus. If this is to become an abscess, there must be a second element of an infectious nature present. When a sufficiently large opening has been made into the sinus, and the pus has been discharged from the abscess, the mucous membrane lining the sinus is seen to be red and inflamed, swollen, and thickened sometimes to ten or twelve times its natural thickness. Its surface is rough, granular, and even fungoid. Large quantities of these fungoid excrescences may be removed with a curette, or destroyed by the injection of some caustic. The disease may perforate the bony wall of the sinus naturally, usually the inferior wall, but always by a small opening; or it may perforate the cranial wall, and enter the cavity of the skull. Here the dura mater usually limits the extent of the abscess. Sequestra of bone are not uncommon, but they are usually very small, and float freely in the pus. When these cases yield rapidly to treatment, they are of two kinds: either the abscess has been a recent one, which has produced superficial lesions of the mucous membrane, or there has been extensive necrosis. In the latter case the frontal and orbital walls of the sinus have been cast off, the cavity of the sinus has disappeared, and cicatrisation has followed, leaving a deep pit, or hollow, in this region.

The diagnosis is difficult, especially in the beginning. Guillemain thinks there is only one constant symptom, the supra-orbital pain, which is sometimes intense. But I have

known cases of abscess of the frontal sinus in which there was never any pain at any time during the development of the abscess. The disease usually resists all medication, and only disappears when the pus is evacuated. If with the pain there is coryza, ozena, a purulent discharge from one nostril, and the frontal boss is painful and protruberant, and the eye displaced downwards and outwards, the lesion is almost certainly in the sinus, though it may not be abscess. Hence, in these cases, a thorough anterior and posterior rhinoscopic examination should always be made. At a more advanced stage of the malady, when the orbit is involved, the diagnosis may be still more difficult, unless the disease is of the acute variety, when there may be some of the signs of acute inflammation present. Still, even here, while there may be displacement of the eye downwards and outwards, there is rarely any protrusion of the eye forwards. A small orbital abscess, lying behind the tendon of the orbicularis muscle, compressing the canaliculus and causing epiphora, might be confounded with abscess of the lachrymal sac; but if a probe can be passed into the sac, the latter possibility is excluded.

Treatment.—If we are sure that an abscess of the frontal sinus is present, the indications are to open it as soon as possible, drain it carefully, and inject antiseptic solutions, and thus put a stop to the suppurative process. The incision should be made, starting from near the inner canthus, immediately beneath the superior orbital arch, directly outwards, and from an inch and a half to two inches long, so that if the bony wall of the sinus, which is here very thin, has not already been perforated, it may be easily opened. The pus then flows out, and the sinus should be thoroughly washed out with a solution of bichloride (1 to 1000). The opening should be large enough to admit the little finger, and the cavity of the sinus should be carefully examined for fungoid granulations, or osteophytes; and these, if found, should be thoroughly removed. Then the septum between the sinuses should be examined for a perforation, for in some cases this partition wall has been found not only perforated, but almost

entirely absorbed. A drainage tube should then be inserted, and the cavity carefully washed out twice a day. The re-establishment of the channel of communication between the sinus and the nasal fossa is sometimes advisable. This may be done by opening into the ethmoid cells by chisel and mallet, or by trephine, or by introducing a catheter through the fronto-ethmoidal canal, and then a drainage tube after the plan advocated by Panas. After the opening of the sinus along the orbital margin, the first thing necessary is a thorough irrigation of the sinus. After the pus ceases to be discharged through the drainage-tube, the cavity generally begins to granulate from the bottom, and in from three to four months the cavity has usually entirely healed.

The Ethmoid Cells or Labyrinth.—The air-cells, or spaces, of the ethmoid form a pneumatic labyrinth, which increases in width from above downwards. From the uncinate process to the cavity of the skull the ethmoid is pushed into the cavity of the nose. Anteriorly it is connected with the lachrymal bone, and posteriorly it is often connected with the orbital portion of the palate bone. The posterior ethmoidal cells, and the cavity of the sphenoid bone, open in the upper nasal meatus. In rare cases the ostium maxillare is absent, and the maxillary antrum communicates with the ethmoid cells and sphenoid antrum. Sometimes the ethmoid labyrinth sends processes into the frontal sinuses, and occasionally the lateral ethmoid project very markedly towards the orbit.

The Sphenoidal Sinus or Antrum.—The anterior, posterior, and lateral walls of the sphenoidal antrum or sinus are always thin, and sometimes very thin. The anterior wall may be entirely wanting, and then the sphenoid sinus opens into the ethmoid cells. The hollow spaces in the ethmoid and sphenoid bones are by some regarded as a respiratory organ for the anterior and middle fossae of the skull. However this may be, the anatomical relations between ethmoid and sphenoid are so intimate that any chronic process, such as a morbid growth, starting in the sinus or cells of either

bone, is almost certain to involve the other at a comparatively early date.

The symptomatology of the diseases of these bony cavities in the vicinity of the orbit is always perplexing, and a diagnosis is thus rendered extremely difficult. In inflammation of the frontal sinus, pain is sometimes felt in the region of the nasal or inner end of the eyebrow. In inflammation of the maxillary sinus, pain is usually felt in the infra-orbital region. In inflammation of the ethmoid cells or sphenoid antrum, positive subjective symptoms are wanting.

Inflammation of the mucous membrane of these adjoining cavities can by no means be readily distinguished from inflammation of the bony walls of these cavities. In intense suppurative inflammation, the periosteum suffers also; and this may lead to necrosis. It is probable that in the many cases of nasal disease in which orbital abscess is observed, the inflammatory process extended from nose to ethmoid cells, and thence to the orbital tissue. The reverse may also be the case, the disease starting in the orbit and extending to the ethmoid cells, and thence to the nose.[1] Collections of pus in the frontal sinus may lead to orbital abscess, and even to abscess of the brain through the medium of the ethmoid cells. An inflammatory process may extend from the maxillary antrum to the ethmoid cells, orbit, and brain,[2] the walls of the ethmoid cells here becoming absorbed by pressure from the abscess.

In caries of the lamina papyracea, the subjective symptoms are,—dull pain, increased by pressure in the neighbourhood of the diseased bones, and vertigo. Redness of the lids at the inner canthus may be present. A hard tumor may be felt at the inner canthus, and later occur fluctuation, strabismus, diplopia, exophthalmus, and limitation of the movements of the eyeball and vision becomes reduced. Owing to defective closure of the lids, ulceration and perforation of the cornea may occur, followed by phthisis bulbi.

[1] Vossius Archiv. für Ophthalmologie, xxx, 3.
[2] Edinburgh Med. Jour., May, 1866.

In all cases of inflammation, the opening of the ethmoid cells, evacuation of the pus, and the removal of fragments of carious bone, are justified, especially if it is supposed that pus has formed. There may be indications also for opening the neighbouring cavities, such as the frontal sinus, nasal meatus, sphenoid and maxillary antra.

In mucocele of the ethmoid cells, the symptoms are,—a gradual, painless development of a tumor on the inner wall of the orbit, which later shows signs of fluctuation; the eye is pushed forwards and outwards, and sometimes downwards. Until fluctuation appears, it may be confounded with an osteoma growing from the inner wall of the orbit. Puncture or incision of the tumor will decide the diagnosis. It is very often connected with a similar condition of the frontal sinus, but it may proceed directly from the nasal meatus.

Naso-Pharynx.—Polypoid growths in the naso-pharynx may extend into the ethmoid cells. They may possess a partly cartilaginous consistency. It cannot be definitely determined whether all the visual defects which occur in polypi of the naso-pharynx are caused by pressure of the after-growth on the optic canal or in the ethmoid cells, and thence against the inner wall of the orbit. Whatever the cause, the loss of vision is due to pressure on the optic nerve.

Enchondroma of the ethmoid is very rare, and always starts from the base of the skull.

Polypi originating in the ethmoid cells, and confined within these limits, are relatively rare, but nasal polypi usually start from the ethmoid. Polypi of the naso-pharynx, on the other hand, not uncommonly penetrate the ethmoid cells. Then the bridge of the nose seems widened, the orbit is narrowed by the pushing outwards of the inner wall of the orbit, and protrusion of the eye in various directions results.

Fibroma originating in the ethmoid itself has been observed but once;[1] and hence it is generally believed that a fibroma involving the ethmoid usually starts from the bones of the nose.

[1] Wiener Med. Jahrb., 1882.

Osteoma of the ethmoid bone usually starts from some neighbouring cavity. The first objective symptom is a very hard tumor at the inner canthus of the eye. Then follow swelling of the neighbouring part of the cheek, protrusion of the eyeball forwards and outwards, and diplopia. The inner canthus is pushed forwards, as are also the nasal and lachrymal bones. The tumor also usually involves the nasal meatus, pushes the septum nasi to one side, and closes one or both sides of the meatus. It pushes the hard palate downwards. The vision may be normal, or diminished. There may be choked disc, and suppuration of the cornea from an inability to close the lids completely over the eye. If the osteoma of the ethmoid be encapsulated, it may easily be separated from its bony attachments. These osteomata never tend to penetrate the cranial cavity; and in this they differ from bony tumors of the frontal sinus. Their operative removal is not, as a rule, difficult. If, on the contrary, they arise from the frontal sinus and penetrate the ethmoid, their removal is usually dangerous, and gives bad results.

The Sphenoid Bone.—Disease of the body of the sphenoid, whether ending in caries and necrosis or not, may cause not only exophthalmus, but disturbance of vision,[1] on account of the close proximity of the optic canal. Pain occurring in the course of disease of the body of the sphenoid may show itself in a totally different part of the area of influence of the trifacial nerve, and thus lead to a faulty diagnosis.[2]

Polypi in the sphenoidal sinus may develop these independently, or they may originate in the naso-pharynx, and penetrate thence into the sphenoidal sinus and ethmoid cells. They may also perforate the bone and enter the middle fossa of the skull, and even cause meningitis, without giving rise to any disturbance of vision.

Osteoma of the sphenoid may start from the periosteum, or from the diploe. In many cases they are developed from the embryonic remains of cartilage, and sometimes arise in the

[1] Klin. Mon. für Aug., 1863.

[2] See Union Médicale, 1872; also, Virchow's Archiv. f. path. Anat. xvi, 5 and 6.

cavities themselves. They tend to penetrate the cavity of the skull, and, by compression of the optic nerve in the optic canal, early lead to blindness of both eyes.

Hyperostosis and exostosis of the sphenoid may produce the same orbital and ocular symptoms as osteoma of the sphenoidal sinus does.

Enchondroma of the sphenoid is excessively rare, only one case having been reported in literature.

Sarcoma.—In sarcoma of the base of the skull, it is generally very difficult to determine the point of origin. Virchow says that they never start primarily from the mucous membrane of cavities, but from the underlying bone, and the mucous membrane is either secondarily affected, or pushed forward by the growth.

The general symptoms are,—loss of sight, hearing, and smell, facial paralysis and neuralgia, vertigo, somnolence, vomiting, loss of memory, hemiparesis, and loss or impairment of speech. Death results from meningitis or encephalitis. There is no record in literature of sarcoma beginning primarily in the ethmoid, but it may extend into it, and thence through the lamina cribrosa into the cranial cavity.

Carcinoma.—Only one case is reported where the carcinoma started in the sphenoidal sinus.

Maxillary Antrum.—The most frequent pathological process met with in the maxillary sinus is empyema or hydrops of the antrum. Pus may collect in the antrum as a consequence of catarrhal inflammation extending from the nose. The patients usually complain of pain in the region of the upper jaw; and if the collection of pus be considerable, it may flow into the nasal meatus and out through the nostril, or back into the pharynx, when the patient lies on the opposite side. Empyema is not a common affection, because the lining mucous membrane is very thin, and poorly supplied with follicles. The most common source of purulent inflammation is from disease of the teeth, especially of the posterior molars, forming either subperiosteal abscess or abscess of the antrum itself. Another form of disease met with in the

antrum is polypoid cysts, which may originate here, but are much more likely to arise in the naso-pharynx, and involve the antrum secondarily.

Tumors.—Pathological new growths of the superior maxilla differ in their clinical appearances, according as they start from the alveolar arch, or from the body of the bone. The former are, of course, visible in the mouth. Tumors of the antrum are difficult to recognise, if they have not already caused distension of the sinus. The symptoms are,—pain in the upper teeth, a dull pain in the region of the antrum, discharge of pus and blood from the nose in lying down, and more or less epiphora, or overflow of tears. As the tumor grows, the walls of the antrum are gradually absorbed, and a new, thin scale of bone is developed from the periosteum. This may occur in the anterior wall, or in the orbital wall, or in the alveolar wall, and the tumor soon extends towards the nose, and causes great enlargement of the hole communicating with the nasal meatus. These nasal growths extending from the antrum are often erroneously mistaken for nasal polypi. Finally the growth frees itself from its bony envelope, and comes to lie immediately under the soft parts. If a swelling appears simultaneously in all the above places, a diagnosis may be made oftener in the antrum. Protrusion of the anterior wall of the antrum alone might mean a cyst of one of the tooth cavities, or a periosteal tumor, as well as a tumor of the antrum. In such cases puncture with a trochar would probably differentiate between an external and an internal tumor. Later the diagnosis becomes more difficult. A large tumor of the antrum would probably increase the breadth of the cheek, would push the nose towards the opposite side, and would push the eye upwards and outwards. If the tumor grows from the bone itself, the inferior orbital margin is decidedly broadened. Tumors of the antrum itself rather tend to break through into the nose, the mouth, or the orbit.

Tumors of the superior maxilla, whether they start from the bone or the antrum, gradually extend into all the neigh-

bouring cavities. They early involve the nasal meatus, thence extend into the spheno-maxillary and palatine fossae and pharynx, and finally perforate the base of the skull. They usually involve the orbit later, and sometimes extend into it from the ethmoid cells, even before the floor of the orbit is perforated. The treatment of these tumors consists either in extirpation of the growth in partial resection or in total resection of the superior maxilla.

Tumors of the Naso-Pharynx.—Fibroid tumors of the pterygo-palatine fossa may enter the orbit through the infra-orbital fissure. They cause neuralgia of the infra-orbital or posterior alveolar nerves. The orbital portion of the tumor may divide into two branches,—one involving the eyeball, and the other extending into the cranial cavity through the supra-orbital fissure. These tumors eventually extend into all the neighbouring cavities.

CONCLUSIONS.

Tumors of the Sphenoid.—So long as a pathological process, whether it be inflammatory or a new growth, is limited to the antrum of the sphenoid, the subjective symptoms are either entirely absent, or there may be severe pain in the head. If the process extends to the neighbouring structures, symptoms arise which point to the probability that the sphenoid bone is the seat of the disease, such as blindness due to compression of one or both optic nerves, the visible or tangible presence of the growth in the naso-pharynx, ethmoid, orbit, or skull. The entrance of the growth into the cranial cavity may occur without any subjective symptoms, or there may be severe headache. If the progress of the growth is very rapid, meningitis or cerebral abscess will result. The ophthalmoscopic symptoms are either papillitis or atrophy of the optic nerves, due to perineuritis and pressure of the swollen nerve-sheath on the optic-nerve fibres. In some cases the pressure is exerted on the optic nerve in the optic canal. Tumors of the sphenoid antrum may perforate the middle fossa of the skull without causing blindness; and when blind-

ness does occur in these cases, it is not necessarily due to pressure on the optic chiasm, for it may be unilateral. If an orbital tumor rapidly causes blindness, and the latter starts from the temporal side of the field and leaves the region of the macula lutea unaffected to the last, and if at the same time a growth appears in the naso-pharynx, it is probable that the tumor began in the sphenoid antrum.

Tumors of the Ethmoid.—A morbid growth confined within the ethmoid cells gives rise either to no symptoms at all, or merely to headache. Inflammation of the mucous membrane lining the ethmoid cells may extend from the naso-pharynx, the frontal sinus, the maxillary antrum, or the orbit. The ethmoid cells may be turned into a single large cavity by a collection of mucus, or pus, within it.

So long as a tumor is contained within the limits of the ethmoid cells, there are either no subjective symptoms, or there are paroxysmal headaches, with a feeling of heat, and epistaxis. The orbital symptoms are the same as those of tumor of the orbit. The mobility of the eyeball is limited. The vision may be only slightly affected, or there may be complete blindness. The visual field may not be affected. If the tumor has entered the naso-pharynx, the mouth is more or less open, and the speech is nasal. Later there is loss of the sense of smell. If the ethmoid cells are opened into by the growth, there is more or less continuous dropping of cerebro-spinal fluid from the nose, owing to a communication between the upper wall, or roof, of the ethmoid cells and fissures at the base of the skull. There may also be orbital or palpebral emphysema, and haemorrhage from the nostril on the same side.

Mucocele, or Abscess of the Frontal Sinus.—In chronic inflammatory disease of the frontal sinus there may or may not be supra-orbital pain. If the process is confined to the frontal sinus, there is no other symptom. If, in addition to the pain, there is sensitiveness on pressure over the frontal boss, swelling along the under surface of the supra-orbital margin and along the inner wall of the orbit, and displace-

ment of the eyeball downwards and outwards, it is probable that the disease has extended from the frontal sinus to the ethmoid cells. If, in addition to these symptoms, there is coryza, ozena, and a purulent discharge from the nostril, the nasal meatus here become involved, and the diagnosis is certain. But unless all of these symptoms are present, the diagnosis is very difficult and almost impossible.

If the first symptom of orbital complication is the appearance of a dense, hard swelling at the upper and inner angle of the orbit, along the superior orbital margin and region of lachrymal bone, and if the growth is slow and painless, the disease is almost certainly an osteoma of the frontal, which will eventually involve the orbital plate of the ethmoid, and, later, the cavity of the skull.

Tumors of the Maxillary Antrum.—Tumors of the antrum may cause pain in the teeth, or in the region of the infra-orbital nerve, but not until they have attained considerable size and have more or less completely filled the antrum, the distension of the walls of the cavity causing the pain by pressure on the nerve twigs. Later the diagnosis may be rendered easier, either by a projection forward of the anterior bony wall, or by dislocation of the eyeball upwards and outwards, or even upwards and inwards, by the protrusion of the floor of the orbit. Usually, at this stage of the growth, the tumor may also be present in the nasal meatus or pharynx, or in both. In no case is it possible to diagnosticate a tumor of the antrum early in its development.

ADDRESS: BIBLICAL MEDICINE.

By Rev. W. C. Bitting, M. A., of New York City.

October 29, 1891.

Man's first want is something to eat, shelter, and clothing. His next desire is for some kind agent to heal his wounds, rectify abnormalities of his body, and prevent as far as possible future physical sufferings. The two most popular persons with the general public are the caterer and the doctor. Only an exceptional few admit the preacher to a rank with these, for the order generally is first the body and then the soul. And so very early out of the womb of necessity, that fertile mother whose varied offspring have so enriched the world, there came the art of medicine. No one knows how soon Mother Eve began to tie up the stumped toes of her boys, or tax her wits for a remedy to stop the aches and cries of the urchins who set the small boy the first example of dining on green apples. We are not told about Adam's midnight walks with the babies, nor Eve's hysterics over the loss of her flower garden. All these experiences doubtless had a place in their lives, if not in their diaries. Yet with the first pains, births, and bruises, there began to whirl in human brains those nebulous ideas of remedy and prevention which have since become more and more com pacted into science. Out of the crude and coarse efforts to cure the first illness, and rescue from the grasp of death the first stricken one, there has been evolved slowly and superbly the modern art divine.

Very plainly can it be seen that the loving Father of all men has smiled upon attempts to soften pangs of every kind. While each man must reap what he sows, the iron law of the harvest has been much tempered by the skill of man in so far as the flesh is concerned. There is no progress in art, com-

merce, or literature, comparable to the almost infinite strides made by the science of medicine. And this advance is the proof of the divine benediction upon human effort to mitigate the effects of sin. It is that we may be conscious of this vast development that I have chosen as my subject for this evening BIBLICAL MEDICINE. While we sit on the modern heights of achievement, with boundless prospects before us, it may increase our sense of the loftiness of our climb if for awhile we turn to look at the beginnings.

The Bible, which is the library of ancient Hebrew literature, touches life at all points. Because it photographs the various times during which occurred the events it records, we may reasonably expect to find hints of the arts and sciences of those periods. As it does not leave unnoticed the degradations of men, so it records faithfully the efforts made to lift them up. Chiefly, it deals with the religious history of the most remarkable people of olden times; it touches politics, science, art only incidentally, and then *always records the ideas of the day*. Its one supreme purpose is to tell of the religious experiences of a nation in their development. Whatever else it unfolds of the times of which it treats is only subordinate. Nevertheless we prize the intimations of all functions of life which it gives, taking care to regard its utterances on other than spiritual matters as merely the popular conceptions of the day, and in no sense the subject of divine revelation to men.

The Bible is no foe to medicine. The physician's art is never spoken of slightingly, nor his function in society derided. On the contrary, there is no calling in life to which so much allusion is made, nor does any other art furnish so large and important a part of the divine vocabulary as the art of medicine. The whole book abounds in figures of speech drawn from the diseases of the body and the relation of medicine to them. God speaks of himself, and is spoken of, as Jehovah who heals.[1] Jesus likens his relation to men's moral abnormalities to that of a physician's care for physical

[1] Ex. xv : 26; Ps. ciii : 3; Jer. xvii : 14; xxx : 17.

misfortunes.[1] Luke, the author of the third gospel and of the only history of the church in the New Testament, was a physician.[2] He alone mentions the healing of Malchus' ear.[3] To him we owe the beautiful parable of the good Samaritan with its medical hints.[4] He alone records certain interesting medical facts concerning the birth and infancy of Jesus and John the Baptist.[5] He alone tells us of Paul's recovery of sight, and the falling of the scales from his eyes.[6]

The sins of men are constantly likened to leprosy, lameness, and other diseases. Precisely the same expressions are applied both to physical and spiritual perfections and abnormalities. So general is this, that not a sermon can be preached, nor a book written, about either sin or sanctity, without terms of health or disease. Hygeia has lent her name to holiness;[7] for health, wholeness, and holiness, are the same thing spiritually. Even orthodoxy is often called "sound doctrine."[8] To-day it is too often the doctrine of sound: much depends upon whether you sail in canoes of Birch or on Brig(g)s. The word *θεραπεύω* from which comes our word therapeutics means also to worship[9] as well as heal,[10] and is so used by Paul in his sermon at Athens. The words for spiritual and bodily infirmities and weaknesses are the same.[11] The very word for salvation itself is used of bodily well-being.[12] If we turn from the accurate Greek to the pict

[1] Mt. ix : 12 ; Mk. ii : 17 ; Lk. iv : 23 ; v : 31.
[2] Col. iv : 14.
[3] Lk. xxii : 51.
[4] Lk. x : 30–37.
[5] Lk. i : 31, 36, 41–44, 57, 58 ; ii : 5–7, 21.
[6] Acts ix : 18.
[7] *ὑγιαίνω* Lk. v : 31 ; 1 Tim. i : 10 ; vi : 3 ; 2 Tim. i : 13 ; iv : 3 ; Tit. i : 9, 13 ; ii : 1, 2.
[8] Tit. i : 9, 13 ; ii : 1, 2, 8.
[9] Acts xvii : 25.
[10] Mt. iv : 23, 24; 43 times in N. T.
[11] *ἀσθένεια, physical,*—Mt. viii : 17 ; Lk. v : 15 ; viii : 2 ; and 17 times in N. T. ; *spiritual,*—Ro. viii : 26 ; 1 Cor. xv : 43 ; Heb. iv : 15 ; v : 2. *ἀσθενέω, physical,*—Mt. x : 8 ; xxv : 36 ; and 21 times in N. T. ; *spiritual,*—Ro. iv : 19 ; viii : 3 ; xiv : 1, 2, 21 ; 1 Cor. viii : 9, 11, 12, *et als.* *ἀσθένημα, only spiritually,*—Ro. xv : 1. *ἀσθενής, physical,*—Mt. xxv : 39, 43, 44 ; Lk. x : 9, *et als.; spiritual,*—Mt. xxvi : 41 ; Mk. xiv : 38 ; Ro. v : 6 ; 1 Cor. iv : 10 ; viii : 7, 10 ; ix : 22. *κάμνω,*—Heb. xii : 3 ; Jas. v : 15 ; Rev. ii : 3. *ἰάομαι, spiritually,*—Mt. xiii : 15 ; Lk. iv : 18 ; Jno. xii : 40 ; Heb. xii : 13.
[12] *σωτηρία,*—Acts xxvii : 34. *σώζω,*—medical use 20 times, spiritual use 76 times, in N. T.

uresque Hebrew, the case is the same. The utter moral degradation of the people is described by the expression, "The whole head is sick, and the whole heart faint. From the sole of the foot even unto the head there is no soundness in it; but wounds, and bruises, and putrefying sores: they have not been closed, neither bound up, neither mollified with ointment."[1] The lexicon will reveal numerous uses of words to describe both physical and ethical diseases.[2] Of all persons in the world the doctor ought to be most able to describe states of soul most accurately, because his sources of figurative language are the most fertile. No one can depict the awful results of wrong-doing to the higher nature, and the blessed fruits of a life of uprightness, so graphically as the physician. Everywhere the Bible exalts the honourable function of the healing art. Even in the visions of Heaven the seer saw the tree whose leaves "were for the healing of the nations."[3]

I. The Sources of Medical Knowledge among the Hebrews. These are partly spontaneous, partly acquired.

1. No doubt many of the simplest remedies were discovered in their earliest history by accident, or crude experiments, such as occurred in any other primitive people's experience; but of these no hint remains. The rising sense of the value of human life would naturally evolve many expedients. But medicine never was a science among the Hebrews. Semitic minds have given religion and poetry to the world, but not science. No organised knowledge of any sort came from Abraham's descendants before the Christian era. Before the Exodus the hints of medicine are very scarce. We learn that men were born, and died. Some obstetrical cases are

[1] Is. i : 5; Prov. xvii : 22; iii : 8; xii : 18; xx : 30; xxix : 1; Eccl. iii : 3.

[2] חלה,—Gen. xlviii : 1, *et als.*; cf., Prov. xiii : 12. פסח,—lame, 1 K. xviii : 26; cf., Lev. xxi : 18. Cf. כהה,—Nah. iii : 19; Jer. xiv : 19; xxx : 13; Mal. iv : 2. רפא,—to heal, physically and morally. Among words for sin are עוה (distortion), עקל (wrenching or twisting), and רע (ruin, distress). The words thus used, of both physical and moral right and wrong, are very numerous. Cf. also Is. vi : 10; xxix : 18; xlii : 18, 19; Ex. vi : 12; Ps. li : 17; Eccl. vi : 2; Jer. vi : 10; ix : 26; Ezek. xliv : 7, 9; Prov. xiv ; 30; Mt. xv ; 14; Acts vii : 51; Ro. ii : 29; Col. ii ; 11, *et als.*

[3] Rev. xxii : 2.

mentioned with interesting fulness. We hear of a precocious infant immediately grasping the heel of his twin brother who was born but a moment before,[1] a process of tripping which he diligently pursued in after years with others as well. His name was Jacob, which literally meant *heel-catcher*, or supplanter. Poor Rachel dies in bringing forth Benoni (Benjamin),[2] "the son of her sorrow." At the birth of Pharez and Zarah, the illegitimate twins of Judah and his daughter-in-law Tamar,[3] there was a queer presentation of one of them, which you can diagnosticate at leisure. A scarlet thread was tied around the hand of one, only to be withdrawn into the uterus, while the unmarked brother emerged. It seemed as if the bastard had infantile doubts about entering the cold world.

2. The acquired sources of knowledge were numerous. While not launching into the pregnant world of experiment, the Israelites absorbed the results of others' industry with avidity. Chief among these nations who contributed to their knowledge are,—

a. The Egyptians. For 430 years they were in bondage to the most enlightened people of the world. Herodotus[4] says of the Egyptian physicians, "The medicine practice was divided among them as follows: Each physician was for one kind of sickness and no more; and all places are crowded with physicians, for there are physicians for the eyes, physicians for the head, physicians for the teeth, physicians for the stomach, physicians for internal diseases." There were specialists in those days. The fame of these practitioners went through the world. Cyrus had them sent from the land of the Nile, and Darius kept them at his court continually.[5] Homer speaks very gracefully of their skill.[6] The "many medicines" of Egypt are mentioned by the Jewish Jeremiah.[7] The mummies which they embalmed[8] lie before our eyes today, and prove how hoary a "chestnut" is the joke that joins the doctors to the undertakers. The teeth of some of these

[1] Gen. xxv : 24-26.
[2] Gen. xxxv : 16-18.
[3] Gen. xxxviii : 27-29.
[4] Herod. ii : 84.
[5] Herod. iii : 1, 129-132.
[6] Iliad ix : 381; Od. iv : 229.
[7] Jer. xlvi : 11.
[8] Gen. l : 2, 26.

mummies reveal a perfection in dentistry not excelled to-day. Every house of royalty, after death entered it, became a dissecting-room, and post-mortem examinations were made in order to embalming wherever possible. Among such physicians the enslaved people lived nearly four centuries and a half, and must have learned much. Their emancipator, Moses, "was learned in all the wisdom of the Egyptians,"[1] and evidently made good use of his education in after years. It may interest you to know that one of the Biblical names of Egypt, Ham (dark), remains in the syllable c-h-e-m, in the words alchemy and chemistry, and bears witness to the medical fame of that land.[2] The stock of lore gained during this bondage was little increased until after the great captivity, when the influence of the Greek schools was felt.

b. The contact with Canaanite peoples during the occupation of Palestine and the various exiles in the east, may be named in passing; but their influence cannot be discerned medically. It is very interesting to note that the Canaanites of northern Palestine, whom the Hebrews drove out, were the same race known to us as Phoenicians, the parent tribe of letters, building, and navigation.[3]

c. The Greek schools of medicine poured out their treasures in later days. With them the healing art became a science. The same cultured race that conquered the world with its arts and sciences gave medicine to the warlike Roman and the religious Jew. During what is known as the inter-Biblical period, that time between the ending of the Old Testament writings and the beginning of New Testament history, this western culture more and more leavened the conservative Hebrews, until the practice of medicine in Palestine in Christ's day was not essentially different from that in any other place. During this time we find mention of physicians with honour, and discussions on the wisdom and methods of preventing disease.[4] Rank and praise were

[1] Acts vii : 22.
[2] Stanley. Lectures on the Jewish Church, Vol. I ; lect. iv, I, *note.*
[3] Ibid., lect. ix. Cf. LXX ; Ex. xvi : 35 ; Josh. v : 1.
[4] Ecclus. xviii : 19 ; x : 10.

the portion of the doctor, and his calling was of the Lord.[1] No doubt they were as heartily dissatisfied with such fees as their fellow-professionals are to-day. It is but fair to add, that the doctors in Jesus' day did not enjoy the best reputation for skill,[2] for we have mention of a woman who "had suffered many things of many physicians, and had spent all that she had, and was nothing bettered, but rather grew worse."

We will see later how religious ceremonials, coupled with the essentially unscientific character of the Semitic mind, will account for the slow development of medicine among this people.

II. Who were the Hebrew physicians?

If we remember that most diseases were attributed to the penal infliction of Jehovah, it will not surprise us to learn that the priests[3] and prophets[4] were the recognised physicians of the Israelites. It is interesting to see how people will go to preachers for treatment, when they need doctors. How much we have failed to learn that often men and women need medicine when they come for spiritual comfort, and need consolation of mind often when they visit physicians! The law forbade any Levite to practise who was blind, or was the victim of defective eyesight. Nor was any one allowed to make an examination of a patient in the twilight, or on a cloudy day.[5] It might be a wise regulation were these laws insisted upon in our day. It is but fair to say that others than these priests and prophets tried to practise;[6] but it seems that often professional bigotry or medical sectarianism asserted itself then as now, and the king Asa was severely rebuked because he consulted Canaanite quacks.[6] In all his wretchedness, Job drops a hint of the

[1] Ecclus. xxxviii : 1, 3, 11.
[2] Lk. viii : 43; Mk. v : 26.
[3] Lev. xiii : 1-56; Deut. xxiv : 8, 9.
[4] 1 K. xiii : 6; xvii : 17; 2 K. i : 4; ii : 21; iv : 39-41; viii : 29; xx : 7; 2 Chr. xvi : 12.
[5] McClintock & Strong's Cyclop., art. Medicine.
[6] 2 Chr. xvi : 12; 1 Sam. xvi : 16; 1 K. i : 2-4; 2 K. viii : 29; ix : 15.

poor practitioners of his time by telling his three would-be comforters, "Ye are forgers of lies, ye are all physicians of no value."[1] Impatient patients have imitated Job in all generations.

On one branch of medicine there was a corner. Only women presided at childbirth. We look in vain for any case where masculinity was admitted to assist in this monopoly of femininity. Does time move in circles? Are we nearing such a state of things to-day?

III. Perhaps there is no better way of revealing at once the fulness and poverty of Biblical medicine than by taking up each branch as it is taught to-day in our great colleges. Such a method will also enable us to see the enormous progress that has been made, and will also magnify the advance of the human mind in obeying the divine command to "have dominion over all the earth," "and over every living thing."[2]

1. *Obstetrics.*—Let us naturally begin with obstetrics, which treats of the opening gates of life. Birth precedes disease. In Eden there came to "the mother of all living"[3] the prophecy of the common doom of woman, "In sorrow thou shalt bring forth children."[4] While painless parturition is unknown, it is true that in Oriental countries, and in all countries under primitive forms of civilisation, women have fewer pangs of labour than in modern times where the modes of living and the deformities of fashion multiply sorrow. Very little help seemed to be needed by some Hebrew women. They laboured so easily that birth occurred often before assistance could arrive.[5] This branch was, as we have said before, wholly committed to midwives,[6] of whom we find no mention after the Exodus, with possibly one exception.[7] The word used indicates this by its form. Some of these Hebrew Junos were famous, and the names of two are mentioned,[8]—Shiprah and Puah, or, to translate, Miss Beauty and Miss Mouth.

[1] Job xiii : 4.
[2] Gen. i : 26, 28.
[3] Gen. iii : 20.
[4] Gen. iii : 16.
[5] Ex. i : 19.
[6] Gen. xxxv : 17; xxxviii : 28.
[7] 1 Sam. iv : 19.
[8] Ex. i : 15.

Very suitable were these names. Miss Beauty could flatter the mother, and Miss Mouth could start the gossip. The use of delivery stools is mentioned,[1] and receives remarkable confirmation from a picture on the walls of the palace of Luxor illustrating the birth of the eldest son of Thotmes IV, very possibly the first-born of the Pharaoh who was overthrown in the sea[2] while pursuing his escaping slaves. The mother is on the stool, and two midwives are chafing her hands, while a third holds the babe beneath the couch.[3] Immediately on birth the umbilical cord was cut,[4] the child was washed and rubbed with salt, and then tightly bandaged to prevent all possible distortions during its tender days.[5] The latter custom has been almost universal, and was abandoned among us only in the last century. After the birth of a son the mother was ceremonially unclean seven days, and remained at home thirty-three days longer. This period of defilement and seclusion was doubled in case the child was a girl.[6] Then, as now, a premium was put upon boys. Theirs was not the only civilisation under which woman was at a disadvantage from birth.

False conception (ἐμπνευμάτωσις) was known. Though no instance is cited, it was used as a figure of speech.[7] The production of monstrosities is also alluded to.[8] The law provided a punishment for producing miscarriage by a blow,[9] and was fertile in regulations for the welfare of pregnant women[10] and the care of children.[11] The joys of the happy mother become the common metaphor to describe national and per-

[1] Ex. i : 16.
[2] Ex. xiv : 26, 27 ; xv : 4.
[3] Sharp's History of Egypt, i. 65.
[4] Ezek. xvi : 4.
[5] Job xxxviii : 9 ; Ezek. xvi : 4 ; Lk. ii : 7-11.
[6] Lev. xii : 1-5.
[7] Is. xxvi : 18.
[8] Ps. vii : 14.
[9] Ex. xxi : 22.
[10] Ex. xxi : 22.
[11] The Hebrews had eight words for child life,—ילד, new born babe ; יונק, the suckling ; עולל, child beginning to ask for food ; גמול, the weaned child ; טף, the child clinging to its mother ; עלם, child becoming firm ; נער, the lad (one who shakes himself free) ; בחר, the ripened one. Edersheim's Life of Christ, i : 221, note 3.

sonal delight,[1] and her acute sufferings in birth are often employed to express the throes of political disasters.[2]

2. *Pathology.*—Diseases were contemplated from a theological point of view. All that they could not explain were referred to the action of celestial or infernal beings. Wounds in battle and those due to accident, and most external diseases, they could account for; but internal troubles which were always full of mystery, and wholesale affections, such as epidemics[3] and pestilences[4] and sudden diseases,[5] and invasions of serpents,[6] were all attributed to Jehovah. Even the heathen nations about them likewise explained their sufferings. This was the philosophy of the Philistines during the prevalence of haemorrhoids.[7] Dire calamities were invoked as God's curse on offenders even by such an one as cultured David.[8] It was the devil that caused all Job's misery,[9] notwithstanding his friends and his wife laid it to God's displeasure with him.[10]

The great mystery of demoniacal possession,[11] which neither medicine nor theology has been able to explain, was always attributed to the evil spirit. Jesus declared that the woman bowed together for eighteen years with an infirmity had been bound by Satan.[12] They had not studied normal life closely, and hence knew little of abnormality. They knew nothing of those changes in tissue which constitute disease. In vain we look for one instance of diagnosis of disorder of internal organs by external symptoms. At the most they could indulge only in clever guess-work. Not one of them had ever seen under the skin of a human body, save as accident or battle had given them occasional glimpses; and then they

[1] Is. xxvi : 17; 2 K. xix : 3; Jer. iv : 31; xiii : 21; xxii : 23; xxx : 6; Mic. iv : 9, 10.
[2] Ps. xlviii : 6; Is. xiii : 8; xxi : 3; Jno. xvi : 21, 22.
[3] 1 Sam. v : 9.
[4] 2 Sam. xxiv : 15; Lev. xxvi : 25.
[5] Deut. vii : 4; Prov. vi : 15.
[6] Num. xxi : 6.
[7] 1 Sam. vi : 1-9.
[8] 2 Sam. iii : 29.
[9] Job ii : 7.
[10] Job ii : 9; viii : 1-6.
[11] Mk. ix : 17-27; xii : 22, *et als.* See table of miracles at the end of this paper.
[12] Lk. xiii : 16.

turned their heads away rather than gaze with scientific intent. Possibly a thought of the law of heredity is indicated in the second commandment.[1]

The diseases mentioned are many. Some of them we are at a loss to name because of meagre descriptions. Eastern countries are fertile in diseases of the skin and eye, and dysentery and fevers. We find frequent mention of ophthalmia,[2] and blindness inflicted,[3] total,[4] and congenital;[5] also of inflammation due to heat, night dews, sea breeze, flying sand, and injury often followed by loss of vision.[6] Leprosy is described in many loathsome forms, though we find no mention of it until after the Exodus.[7] Boils or carbuncles or abscesses seemed to have been frequent.[8] Ulcers on the legs are mentioned,[9] and cutaneous eruptions of various forms alluded to.[10] Fevers[11] burned then as now. Dropsy[12] came with its aqueous curse. Apoplexy[13] suddenly cut down its victims. Consumption[14] thrust its ghastly symptoms into family life. Rheumatism and gout[15] twisted the joints of high livers, and perplexed men as much then as to-day. Epilepsy[16] threw down men into foaming fits. Palpitation of the heart[17] robbed them of breath. Atrophy of limbs[18] produced deformity. Palsy and paralysis[19] are mentioned only in the New Testament. Dysentery griped its victims in agony.[20] An epidemic of haemorrhoids opens a painful picture of whole towns

[1] Ex. xx : 5.
[2] Gen. xxix : 17; Lev. xix : 4; Deut. xxvii : 18; Mt. ix : 27; xii : 22, *et als.*
[3] Acts ix : 9; Lev. xxvi : 16; Zeph. i : 17; 1 Sam. xi : 2; Jer. xxii : 12.
[4] Deut. xxviii : 28, 34; 2 K. vi : 18; 1 K. xiv : 4; 1 Sam. iv : 15; Gen. xxvii : 1.
[5] Jno. ix : 1, *et seq.*
[6] Lev. xix : 14; Deut. xxvii : 18; Mt. xii : 22.
[7] Lev. *cap.* xiii; xiv : 3; xxii : 4; Num. xii : 10; 2 K. v : 1-27; vii : 3, 8; *et als.*
[8] Lev. xxi : 10; xxii : 22; Deut. xxviii : 27; 2 K. xx : 7; Job ii : 7.
[9] Deut. xxviii : 35.
[10] Deut. xxviii : 27.
[11] Lev. xxvi : 16; Deut. xxviii : 22; Mt. viii : 14.
[12] Lk. xiv : 2; 1 K. xv : 23 (2 Chr. xvi : 12).
[13] 1 Sam. xxv : 37.
[14] Lev. xxvi : 16; Deut. xxviii : 22; Is. x : 16.
[15] 2 Chr. xvi : 12; Jno. v : 2, 3.
[16] Mk. xix : 17; Lk. 9 : 38.
[17] Gen. xlv : 26; Deut. xxviii : 65.
[18] 1 K. xiii : 4-6; Mt. xii : 10-13; Lk. vi : 10; Jno. v : 3.
[19] Mt. iv : 24; Lk. xiii : 11; Acts iii : 2.
[20] 2 Chr. xxi : 15-19; Acts xxviii : 8.

unable to sit down comfortably.[1] A case of worms[2] is referred to. Sunstroke was known.[3] The natural decay of old age[4] was of course very common. Diseases of the organs of generation were no doubt known. Gonorrhoea[5] or blennorrhoea seems to be mentioned. Some have supposed that the symptoms of Job's and David's diseases[6] indicate syphilis. Miscarriages and false conceptions[7] occurred. Lethargy[8] seems exalted to the dignity of physical ailment. Barrenness[9] was held to be the most awful curse of womanhood. Well might our women to-day imitate the example of Hannah[10] and others,[11] who prayed for offspring, rather than use every device, legitimate and criminal, to escape the burdens of maternity. Cancer[12] ate its way into the vitals in some cases. Daniel mentions a fainting spell.[13] Nervous exhaustion[14] was dosed with a little wine—an example that men in all ages have been quick to follow. Metrorrhagia[15] sometimes occurred. The mental diseases are seldom mentioned. We have an account of Saul's acute insanity,[16] of David's feigning madness,[17] and of melancholia,[18] and of Nebuchadnezzar's lycanthropy,[19] besides other allusions to derangements of mind.[20] We notice references to pestilences,[21] the evil diseases of Egypt,[22] sudden deaths,[23] lameness,[24] and unnamed sicknesses.[25]

[1] 1 Sam. v : 6; vi : 4.
[2] 2 Macc. ix : 5-9.
[3] 2 K. iv : 19; Ps. cxxi : 6.
[4] Gen. xlviii : 1; 2 K. xiii : 14.
[5] Lev. xv : 2, 3; xxii : 4; Num. xxv : 1; xxxi : 7; Josh. xxii : 17.
[6] Job ii : 5-8; Ps. xli : 8.
[7] Ex. xxi : 22; Is. xxvi : 18.
[8] Gen. ii : 21; 1 Sam. xxvi : 12.
[9] Gen. xx : 18; xii : 17; xxx : 1, 2; xiv : 16.
[10] 1 Sam. i : 11.
[11] Gen. xxx : 22, 23; Lk. i : 7, 13.
[12] 2 Tim. ii : 17.
[13] Dan. viii : 27.
[14] 1 Tim. v : 23.
[15] Lev. xv : 25; Lk. viii : 43.
[16] 1 Sam. xvi : 23.
[17] 1 Sam. xxi : 15.
[18] Deut. xxviii : 28.
[19] Dan. iv : 33.
[20] Jno. x : 20; Acts xii : 15; xxvi : 25.
[21] Deut. xxxii : 24; 1 K. viii : 37; 2 Chr. xx : 9.
[22] Gen. xx : 18; Ex. xv : 26; Lev. xxvi : 16; Deut. vii : 15; xxvi : 16.
[23] Gen. xxxviii : 7, 10; Ex. xi : 4, 5; 1 Sam. xxv : 38; 2 Sam xii : 15; 1 K. xiv: 1; 5, *et als.*
[24] 2 Sam. iv : 4; Job xxix : 15; Prov. xxvi : 7; Isa. xxxv : 6; Jno. v : 3; Heb. xii : 13.
[25] 1 Sam. xix : 14; xxx : 13; 2 K. xiii : 14; Dan. viii : 27.

The phenomenon of demoniacal possession is one that has baffled alike the doctor and the preacher. There is no mention of the ailment in the Old Testament, nor in the Apocrypha, nor in the Mishna. It seems to have been confined to the period of Jesus' life in Palestine. The cases are too numerous to mention. The symptoms were confused consciousness;[1] the effects were dumbness,[2] blindness,[3] epilepsy,[4] insanity,[5] mania for homicide and suicide.[6] Were it not for the confused consciousness, we could easily classify the affliction. The view of this terrible malady will depend entirely on one's theological opinions.

Such is the catalogue of diseases in the Bible. It bears witness to the sameness of humanity at all times, and the constant need of medical attention of every son of Adam. In all generations the great affliction of physical abnormality has challenged both the philosophy and the skill of man.

3. *Anatomy.*—There is nothing to show that the Hebrews had any knowledge of anatomy except such as they could derive from others. From the embalmers or physicians[7] of Egypt they probably learned something, as well as from skeletons left bleaching on the sands of the desert. They knew of joints, and marrow in the bones;[8] but their law forbade them to touch a dead body under penalty of religious defilement.[9] This absolutely prevented any scientific study of the human frame, even had they been inclined to make it. All that marvellous familiarity with our bodies that makes possible the modern miracles of surgery was undreamed of by them. Out of death comes life. And this practical thought had never a chance to grow into deeds and examinations. This temple of the body,[10] of celestial architecture, was unstudied in all their history.

[1] Mt. viii : 29; Mk. i : 24; v : 7; Lk. iv : 41; Acts xix : 15.
[2] Mt. ix : 32.
[3] Mt. xii : 22.
[4] Mk. ix : 17-27.
[5] Mt. viii : 28; Mk. v : 1-5. See, also, Jno. vii : 20; viii : 48; x : 20.
[6] Mk. v : 5; Mt. viii : 28.
[7] Gen. l : 2, 3, 26.
[8] Prov. iii : 8; Ps. lxiii : 5; Job xxi : 24; Heb. iv : 12.
[9] Lev. xix : 11-16.
[10] 1 Cor. iii : 16, 17; vi : 19; Col. vi : 16.

4. *Therapeutics.*—Of course the treatment of disease corresponds to ideas of its cause and nature. As all internal diseases were attributed to God, so his healing work was promised and invoked.[1] In Solomon's prayer at the dedication of the temple[2] he supplicates divine prevention and remedy. Asa is blamed for turning to heathen physicians for cure instead of to the Lord.[3] No sorcery or incantation was allowed by law.[4] In the practice of the priests nothing occult was permitted. What the conceptions of cultured heathen were may be learned from the anger of Naaman, who expected to be cured by the passes of Elisha's hands.[5] Superstitions were in the minds of some, for we read of many waiting for the boiling of an intermittent spring at Jerusalem,[6] under the delusion that an angel troubled the waters.

And yet, very early, men were taught the value of simple remedies. The materia medica was scant indeed. Honey was used for sores, and is so used to-day.[7] Olive oil was even more valuable anciently as a remedy than now.[8] Balsam is named as a favourite drug.[9] Leaves of various kinds were used with healing effects.[10] Plasters of figs were laid on boils.[11] Wine was an antiseptic for wounds.[12] Salt had a wide variety of effects.[13] Fish galls are named as a useful remedy.[14] Oil and mineral baths are referred to by Josephus.[15] The use of saliva for diseases of the eye is referred to,[16] and an eye-salve is prescribed for a blind church,[17] in a word used by Hippocrates. Purging is once indicated by Solo-

[1] Ps. vi : 2 ; xli : 3 ; ciii : 3 ; Jer. xxx : 17.
[2] 2 Chr. vi : 28.
[3] 2 Chr. xvi : 12.
[4] Lev. xix : 26.
[5] 2 K. v : 11.
[6] Jno. v : 2–4.
[7] Prov. xvi : 24.
[8] Is. i : 6 ; Lk. x : 34 ; Mk. vi : 13 ; Jas. v : 14.
[9] Jer. viii : 22 ; xlvi : 11 ; li : 8.
[10] Ezek. xlvii : 12.
[11] 2 K. xx : 7.
[12] Lk. x : 34.
[13] 2 Sam. viii : 13 ; 1 Chr. xviii : 12 ; Ps. 60 : 2 ; Ezek. xvi : 4 ; Zeph. ii : 9.
[14] Tob. vi : 8 ; xi : 11.
[15] De Bell. Jud. i : 33, 5 ; ii : 21, 6.
[16] Mk. viii : 23.
[17] Rev. iii : 18 ; κολλύριον.

mon.[1] The "many medicines" of Egypt are referred to.[2] The only thing resembling a prescription is the formula for making a compound for religious anointing, and the toilet.[3] It was composed of myrrh, cinnamon, sweet calamus, cassia, and olive oil, and was a perfume and not a medicine. Music was used to quiet Saul in his spells of acute mania.[4] Mandrakes were thought to be a specific for sterility and barrenness, and to have a potent influence over erotic passion.[5] We have little mention of chemistry. Moses seemed to know how to calcine gold,[6] and the effect of vinegar on nitre is likened to the influence of a song on the soul.[7] Soap and the cleansing power of nitre are mentioned.[8] The apothecary is mentioned as the compounder of holy oils[9] for ceremonial purposes. The evil influence of dead flies in his ointment became a proverb.[9] The name of one of these spice mixers is given.[10]

An anodyne[11] was offered to Jesus, and refused by Him, after he had been nailed to the cross. It consisted of wine, and some narcotic, variously thought to be gall, or myrrh, or wormwood. This is the nearest indication to an anaesthetic in the Scriptures.

How limited were the ancient means of healing! Even the catalogue of materials used for drugs in the Talmud and the classics is very meagre. How magnificent the stride which now lays under tribute the healing power of vegetable, mineral, and animal kingdoms!

5. *Surgery.*—Only two surgical operations are mentioned. Both were on males,—circumcision[12] and castration.[13] Besides

[1] Prov. xx : 30.
[2] Jer. xlvi : 11.
[3] Ex. xxx : 23, 25, 35 ; xxxvii : 29.
[4] 1 Sam. xvi : 16.
[5] Gen. xxx : 14-16.
[6] Ex. xxxii : 10.
[7] Prov. xxv : 20.
[8] Jer. ii : 22.
[9] Eccl. x : 1.
[10] Neh. iii : 8.
[11] Mt. xxviii : 34 ; cf. LXX; Deut. xxix : 18 ; Prov. v : 4.
[12] Gen. xvii : 10-14, 23-27 ; xxi : 4 ; xxxiv : 14, 15 ; Ex. xii : 48 ; Lev. xii : 3 ; Josh. v : 2-9 ; Judg. xiv : 10 ; Lk. i : 59; ii : 21 ; Acts xv : 1-11 ; Gal. ii : 3.
[13] Mt. xix : 12.

having a religous significance, circumcision aided cleanliness of person, and helped to check incontinency in days when polygamy and lawful concubinage existed, and in warm countries where unchaste desire was apt to flourish. The instrument used was a sharp stone.[1] Moses' wife performed the operation on her sons.[1] Jacob's sons mutilated the inhabitants of the whole city of Shechem in this manner.[2] Joshua engaged in the wholesale practice of it upon all who had neglected it during forty years' wandering in the wilderness.[1] David gave King Saul a dowry of one hundred Philistine foreskins for his daughter Michal.[3]

An awl was used to bore the ears of slaves,[4] and a roller bandage was of service in binding broken arms.[5] Job had genius enough to scrape himself with a potsherd.[6] There is one other operation mentioned, a case of excision, where a rib was taken from Adam's side out of which Eve was made.[7] Some have been unkind enough to intimate that woman has been crooked ever since; others, that it is the nearest she ever came to having a man's backbone; and still others, that Adam could have been more generous with spare ribs for this purpose, and with better results in the end. "Of course it is possible that Almighty God . . . could have performed on Adam in Eden a surgical operation, administering to him an anaesthetic (for it is scarcely conceivable that a loving God would have inflicted on a sinless man in Paradise the pain of a bodily injury without the soothing of an anodyne), taking out of the slumberer one of his ribs, stanching the crimson flow, healing the wound, turning the rib into a woman . . . nevertheless . . . to take the story thus literally . . . is to degrade a solemn, profound parable into a grotesque, ridiculous affair, worthy to take its place, not with the august revelations of the

[1] Ex. iv : 25; Josh. v : 2-9.
[2] Gen. *cap.* xxxiv.
[3] 1 Sam. xviii : 23-27; 2 Sam. iii : 14.
[4] Ex. xxi : 6.
[5] Ezek. xxx : 21.
[6] Job ii : 8.
[7] Gen. ii : 18-25.

Infinite One, but with the cunningly devised fables of heathen legends."[1]

To-day what is there that the knife has not done! Anaesthetic and anatomy have been joined in marriage by the great high priest of science, and from this union flow ten thousand blessings to suffering humanity.

6. *Hygiene.*—In this branch the Mosaic medicine is superb. The laws of public health were wisely administered by the priests.[2] It was their duty to inspect and enforce sanitary arrangements. We might venture to ask some of our modern health officers and street cleaners to read attentively the utterances of Moses, who could be their teacher in more ways than one. They were skilled in preventive medicine, and to this ounce of prevention we owe much silence concerning the pound of cure. We read of no great epidemics sweeping away helpless thousands, and the history of the Hebrew race is singularly free from them. The directions for ceremonial cleanliness surely proved that it was next to godliness.[3]

a. Matters of diet were carefully regulated.[4] The American hog would have no place on the bill of fare of a Hebrew banquet. "Diseases due to use of pork" would be a good subject for your study. The very idea of a modern Chicago or a Cincinnati piggery, into one end of which a herd of filthy swine are driven, and out of which comes at the other end in a few minutes an assorted miscellany of hams, shoulders, sides, jowls, souse, sausages, pickled feet, sweet-breads, bundles of bristles, and buckets of lard, would have thrown Moses into a spasm. To eat blood was a crime.[5] Everything had to be washed before being cooked,[6] and kitchen and table utensils must be free from all taint.[7] To use foods or liquids from a vessel into which a dead body of any unclean beast

[1] Creative Week, G. D. Boardman, *p.* 223.
[2] Lev. xiv : 34-57.
[3] Lev. *caps.* xi to xv ; Num. *cap.* xix.
[4] Lev. *cap.* xi.
[5] Lev. xvii : 10 ; xix : 26 ; Deut. xii : 16, 23 ; xv : 23 ; Acts x : 9-16 ; xi : 1-28.
[6] Mk. vii : 4 ; Lev. i : 9.
[7] Lev. xi : 32-35.

had fallen, or to consume food or drink that had stood uncovered in the apartment of the dead or dying, was absolutely prohibited.[1]

b. Bathing the person was enjoined upon all. Those who touched a dead body of man or beast,[2] who recovered from leprosy[3] or touched a leper,[4] those with any issue or flux (gonorrhoea),[5] or who touched one thus diseased or even his clothes or furniture, or who touched anything that the diseased one had touched,[6] all men after the act of copulation,[7]—all must bathe.

Women also after copulation,[8] menstruation,[9] or any other ceremonial uncleanness, must wash thoroughly. Indeed, we cannot specify all the minute regulations for ablution.[10] They ought to have been the cleanest people on earth. The connection between religion and a copious supply of water is everywhere apparent. No wonder they murmured at scarcity of water.

c. We have already referred to the hygienic value of circumcision. No doubt freedom from venereal disease was largely due to that custom. Many other nations practised it also.

d. While there were no hospitals, the sick were to be isolated as far as possible.[11] The lepers were to be kept outside camps and cities and away from highways,[12] and could come into contact with others only when thoroughly infected, when the disease was supposed to be non-contagious.[13] The house in which leprosy originated was entirely demolished.[11] A little loss of real estate was cheerfully suffered rather than endanger the public health.

[1] Lev. xi : 8, 11, 24, 26, 27, etc. ; Num. xix : 15 ; Lev. xxii : 4–8.
[2] Lev. xi : 25 ; Num. xix : 19.
[3] Lev. xiv : 8.
[4] Lev. *caps.* xiii and xiv.
[5] Lev. xv : 7, 8.
[6] Lev. xv : 1–13.
[7] Lev. xv : 16, 24.
[8] Lev. xv : 18.
[9] Lev. xv : 19.
[10] Lev. xvii : 15, 16 ; xxii : 6 ; Deut. xxiii : 11 ; Ruth iii : 3 ; 2 Sam. xii : 20.
[11] Lev. xiv : 33–45.
[12] Lev. xiii : 45, 46 ; Num. v : 1–4 ; xii : 10–15 ; 2 K. vii : 3.
[13] Lev. xiii : 12, 13.

e. The handling of the dead made persons unclean.[1] While this prevented scientific medicine, it also lessened liability to contagion, and made impossible some of our modern horrible customs, such as the kissing of corpses and extensive funeral parade.

f. Copulation was forbidden with a woman during menstruation,[2] or for seven days thereafter.[3] Intercourse with a brute was punished with death.[4]

g. There was strong legislation against marriage within certain degrees of consanguinity.[5] In the pre-Mosaic period there were no such regulations.[6] Intermarriage with other races was discountenanced,[7] and certain other connections were forbidden,[8] such as with the progeny of incest, a bastard, or one with wounded testes, or excised penis. Whoredom and Sodomy were prohibited.[9]

h. The sanitary regulations for the camps were the very best. Not a privy was allowed within its limits. Every man was to be his own scavenger, covering his dung at each stool without the camp.[10] All refuse from the slaughter of animals was burned[11] outside the camp. Not even the ashes were allowed in the confines of the shifting city. In later days the valley of Hinnom, immediately south of Jerusalem, was made the receptacle of the carcasses of criminals, animals, and general municipal filth[12] by King Josiah, and, according to Kimchi, an eminent Jewish scholar of the thirteenth century, a fire was kept constantly burning to consume the offal.[13] It is this sanitary fact that gave rise to the

[1] Num. v : 2 ; ix : 6, 10 ; xix : 11, 13.
[2] Lev. xv : 24 ; xx : 18 ; xviii : 19.
[3] Lev. xv : 19.
[4] Ex. xxii : 19 ; Lev. xviii : 23 ; xx : 15.
[5] Lev. xviii : 7–17 ; xx : 11, etc.
[6] Gen. xx : 12 ; xi : 29 ; xxviii : 2 ; xxix : 26 ; xxviii : 8, 9 ; Ex. vi : 20 ; Gen. xxxviii : 26–30.
[7] Ex. xxxiv : 15, 16 ; Deut. vii : 3, 4 ; xxiii : 4–8 ; Judg. iii : 6 ; Is. ii : 6.
[8] Deut. xxiii : 1, 2.
[9] Deut. xxiii : 17 ; Prov. ii : 16, 17 ; v : 8–11 ; vii : 6–27.
[10] Deut. xxiii : 12.
[11] Lev. *cap.* iii ; Ex. xxix : 14 ; Lev. iv : 11 ; viii : 17 ; xvi : 27 ; Num. xix : 5.
[12] 2 K. xxiii : 10.
[13] Quoted by Broadus, Commentary on Matt. *in loc.* v : 22.

name "Gehenna of fire,"[1] and furnished to the Jews a figure for the place of future torment.[2] Even the very spoils of war, as well as the soldiers, were to be disinfected before entering the camp after battle. What was inflammable must be bathed in fire to cleanse it, and everything else had to be washed in water.[3] These men were high protectionists in the interest of health. Our government could do nothing better than apply at Castle Garden and Ellis Island these same tests to the hordes of great unwashed immigrants and their baggage. Such things as our filthy streets, bungling scavenger work, foul and disease-breeding tenement-houses, and numerous pest spots, could not have existed in Moses' day. We have evolutionised backward in this matter. O for a modern Moses at the head of our health department!

Such is a brief review of Biblical medicine. We have not had time to go minutely into all its ramifications. Only the most condensed outline has been presented, but any one can study the subject thoroughly by aid of the numerous references given in the foot-notes.

Purposely we have abstained from discussing the therapeutic value of miracles of healing. The theological opinions of men will determine their views of these occurrences. To some, they seem improbable stories, worthy only of utter disbelief. To others, they appear as manifestations of that same Love which is always interested in suffering humanity, and which has fertilised your minds with its own disposition to relieve disease. We add a complete list of Jesus' miracles of healing, that they may be studied by any who desire the delightful meditation. It is from B. F. Westcott's "Introduction to the Study of the Gospels," Appendix E.

A. MIRACLES ON MAN.

I. Miracles of Personal Faith.

(*a*) *Organic Defects* (the blind). 1. Faith *special*. Two blind men. Mt. ix: 29–31. 2. Faith *absolute*. Bartimaeus. Mt. xx: 29–34; Mk. x: 46–52; Lk. xviii: 35–43.

[1] Mt. xviii: 9; Mk. ix: 47.
[2] Mt. v: 29, 30; x: 28; xxiii: 15, 33; Mk. ix: 43, 45.
[3] Num. xxxi: 21–24.

(*b*) *Chronic Impurity.* 1. Open. Leprosy. One leper. Mt. viii : 1–4; Mk. i : 40–45; Lk. v : 12–16. Ten lepers. Lk. xvii : 11–19. 2. Secret. Woman with issue. Mt. ix : 20–22; Mk. v : 25–34; Lk. viii : 43–48.

II. MIRACLES OF INTERCESSION.

(*a*) *Organic Defects.* 1. Blind. Mk. viii : 22–26. 2. Deaf and dumb. Mk. vii : 31–37.

(*b*) *Mortal Sicknesses.* 1. Fever. Nobleman's son. Jno. iv : 46–54. 2. Paralysis. Centurion's servant. Mt. viii : 5–13; Lk. vii : 1–10. Man borne by four. Mt. ix : 1–8 : Mk. ii : 1–12; Lk. v : 17–26.

III. MIRACLES OF LOVE.

(*a*) *Organic Defect.* Blindness. John, *cap.* ix.

(*b*) *Disease.* 1. Fever. Mt. viii : 14, 15; Mk. i : 29–34; Lk. iv : 38–41. 2. Dropsy. Lk. xiv : 1–6. 3. Withered hand. Mt. xii : 9–13; Mk. iii : 1–5; Lk. vi : 6–11. 4. Impotent man. Jno. v : 1–17. 5. Woman with infirmity. Lk. xiii : 10–17.

(*c*) *Death.* 1. In death-chamber. Jairus' daughter. Mt. ix : 18, *et seq.*; Mk. v : 22, *et seq.*; Lk. viii : 41, *et seq.* 2. On the bier. Son of widow of Nain. Lk. vii : 11–18. 3. In the tomb. Lazarus. Jno. *cap.* xi.

(*d*) *Wound.* Malchus' ear. Lk. xxii : 51.

B. MIRACLES ON THE SPIRIT WORLD (Demons and Demoniacs).

(*a*) MIRACLES OF INTERCESSION.

1. Dumb man with demon. Mt. ix : 32–34. 2. Blind and dumb man. Mt. xii : 22, *et seq.*; cf. Lk. xi : 44, *et seq.* 3. Syrophoenician woman's daughter. Mt. xv : 21–28; Mk. vii : 24–30. 4. The lunatic boy. Mt. xvii : 14, *et seq.*; Mk. ix : 14, *et seq.*; Lk. ix : 37, *et seq.*

(*b*) MIRACLES OF ANTAGONISM.

1. In synagogue. Unclean spirit. Mk. i : 21–28; Lk. iv : 31–37. 2. The Gadarene. Mt. viii : 28, *et seq.*; Mk. v : 1, *et seq.*; Lk. viii : 26 *et seq.*

To this list may be added the indefinite statements of the miscellaneous healings.[1]

While this beneficent power was used by the Christ, and committed to his apostles for special uses, there is absolutely nothing in the Bible to sanction the monstrous absurdities of "faith-cure," "mind-cure," "Christian science," and other stupendous follies which are neither philosophic, scientific, nor Christian. Paul did not heal Timothy's stomach "by faith," an external application of sweet oil, and prayer, nor did he tell him of the "influence of mind over matter." He was wise enough to know that a diseased stomach was too

[1] Mt. iv : 23; viii : 16; ix : 35; x : 1, 8; xii : 15; xiv : 14; xv : 30; xix : 2; xxi : 14; Mk. i : 34; iii : 10; iii : 15; vi : 5, 13; Lk. iv : 40; v : 15, 17; vi : 18; viii : 2; ix : 6; x : 9.

aching a fact to be helped in that way, and so prescribed a little wine.[1] But we must be careful not to confound "stomach's sake" with stomach's ache in our therapeutics. We read of no apostasy from his medical career in favour of "faith cure" by Luke, the "beloved physician."[2] It is more than likely that he travelled with the great preacher, Paul, whose eyes were afflicted,[3] in a professional as well as evangelistic capacity, and helped him to preach and write by ministering to his health.

At Epidaurus there was a statue of Aesculapius, your well known mythological deity. In one hand he held a knotty stick; the other was entwined by a serpent.[4] After a while the serpent was wreathed about the staff spirally, and became the symbol of your profession. It was early discovered that the most valuable remedies are poisons, and as the serpent was the very best symbol of all that is deadly, so it was also used as the sign of life that comes through wise use of poisons. Thus to-day this serpent and staff symbolise the healing art, and may be seen sculptured on our hospitals and colleges of medicine.[5] Precisely the same device was exalted by Moses in the camp.[6] The serpent of brass upon the pole became the symbol of God's power over all that was noxious that dreadful day. It was worshipped until the days of Hezekiah, who destroyed it,[7] and was afterwards used by the world's Redeemer as a picture of His own crucifixion.[8] This ancient symbol of your art was thus glorified by the greatest exponent of law, Moses, and the greatest exponent of love, Jesus. Is it not true that the faithful physician is evermore uniting law and love in his ministrations? On that hard, stern fact, that diseases are effects due to causes, harvests reaped from sowings,[9] he builds his diagnosis, finds motives for his cau-

[1] 1 Tim. v : 23.
[2] Col. iv : 14.
[3] Acts xiii : 9; xxiii : 1, *et seq.*; Gal. iv : 14; vi : 11.
[4] Ency. Britt., art. Aesculapius.
[5] Dod's "Gospel of St. John," *p.* 123.
[6] Num. xxi : 6-9.
[7] 2 K. xviii : 4.
[8] Jno. iii : 14.
[9] Gal. vi : 7, 8.

tions, and thunders his just censures at all lawless living,—physical, mental, moral. On the other fact, of discovered remedies, therapeutic, surgical, and hygienic, he offers to humanity the weal of health, the boon of happiness, and becomes the most beneficent factor of civilisation. By unerring indications of law he discovers and prevents disease. By inspiration of love he heals abnormalities, silences the wails and groans of his fellows, and tenderly ministers to human distresses. Be, then, the high priests of law's infallibility, and also of love's redemption, until physical man, seeing the righteousness of law, shall come also not only to obey, but to love it, and you will have wrought gloriously towards mankind's elevation into yet nobler spheres of life.

For Man[1] is everything,
And more: he is a tree, yet bears no fruit;
A beast, yet is, or should be, more:
Reason and speech we only bring.
Parrots may thank us, if they are not mute,
They go upon the score.

Man is all symmetry,
Full of proportions, one limb to another,
And all to all the world besides:
Each part may call the farthest, brother:
For head with foot hath private amity,
And both with moons and tides.

Nothing hath got so far,
But Man hath caught and kept it as his prey.
His eyes dismount the highest star:
He is in little all the sphere.
Herbs gladly cure our flesh, because that they
Find their acquaintance there.

For us the winds do blow,
The earth doth rest, heaven move, and fountains flow.
Nothing we see but means our good,
As our delight, or as our treasure:
The whole is either our cupboard of food,
Or cabinet of pleasure.

[1] "Man," by George Herbert (1593-1633).

The stars have us to bed;
Night draws the curtain, which the sun withdraws:
Music and light attend our head.
All things unto our flesh are kind
In their descent and being; to our mind
In their ascent and cause.

Each thing is full of duty:
Waters united, are our navigation;
Distinguished, our habitation;
Below, our drink; above, our meat:
Both are our cleanliness. Hath one such beauty?
Then how are all things neat!

More servants wait on Man
Than he 'll take notice of: in every path
He treads down that which doth befriend him,
When sickness makes him pale and wan.
O mighty love! Man is one world, and hath
Another to attend him.

IMPURE AIR, AND VENTILATION OF PRIVATE DWELLINGS.

(*The Orton Prize Essay.*)

By Howard Van Rensselaer, M. D., of Albany, N. Y.

October 30, 1891.

We are very much at the mercy of our atmosphere. If food disagrees with us, we can fast; if we suspect our water-supply, we can thirst awhile; but, though we know that the air is contaminated, that it is unfit to take into our lungs, yet breathe it we must, or die.

Twenty times a minute with our inhalations we consume, and with our exhalations we vitiate, about a cubic foot of air. Were we compelled to breathe this air over and over again, we should soon be poisoned and asphyxiated. Fortunately for us, out of doors and in well ventilated rooms nature has provided many ways of diluting and removing the deleterious impurities; but in rooms with doors and windows closed, or in crowded assemblies, the poisonous materials are produced faster than the natural forces can eliminate them. In such places bad effects occur in direct ratio to the number of people present and the time spent in the polluted air.

Were people killed outright by foul air, its dangers would be carefully guarded against; but its effects are slow and insidious, and often ascribed to other causes. We are careless of its results, because, as its effect at any one time is slight, we grow accustomed to it and disregard its risks; and after being in its presence a few minutes our senses become dulled, and do not warn us of the danger. To breathe pure air always we must constantly be on the alert, and in winter we must incur considerable expense. So, though we may be sufficiently educated to appreciate the evils of an impure

atmosphere, yet not seeing its marked effects we become indifferent, or begrudge the time, trouble, and expense necessary to provide a sufficient supply of pure air.

But while the immediate effects seem trifling, yet it is true that any prolonged vitiation of this source of supply interferes with the proper working of our organizations and depresses our vital functions.

Statisticians have shown that of the causes of mortality, the most important and farthest reaching is impure air. Further, they state that the death-rate increases regularly with the density of population; and as to occupations, that persons of a sedentary in-door habit are shorter lived than those whose callings demand an out-door life; and still further, that in cities the mortality is greater in those portions where the air is comparatively stagnant, *i. e.*, in narrow alleys, back-to-back buildings, and crowded tenements, than in other parts of the same city.

So high has been the mortality among the tenement-house districts, and so pressing the need for fresh air, that stringent laws have been passed compelling builders to provide a proper amount of breathing space. Such laws are, that no building occupied by more than three families shall cover more than 78 per cent. of the lot on which it stands; and that every sleeping-, living-, and toilet-room must have a window giving access to the open air. Since passing such laws, the mortality in these approved dwellings has dropped to the average, or slightly below the average, mortality of the city. In 1869, when there were no improved dwellings for the labouring classes, the death-rate in tenements in New York was 28.35 per 1,000. In 1888, when sanitary laws had been passed, and a few better buildings had been erected, it had fallen to 22.71.

Still better results are shown by The Improved Industrial Dwelling Company, of London, which has provided approved homes on a very large scale. Their report of 1891 says that the death-rate in all their dwellings was 11.6 in the 1,000; while the average death-rate in the metropolis was

18.8 per 1,000. At the company's large estate at Bethnal Green it was only 8.5 per 1,000, and the latter, compared with the death-rate of 40 per 1,000 in the large area in the same neighbourhood, speaks volumes for the beneficent work which the company was established to carry out. Thus it is proved that not poverty alone, nor bad food, nor unhealthy work increased the death-rate, for all these conditions remained in the approved dwellings, but simply that the supply of air was inadequate in the one case, and abundant in the other.

In 1848, two hundred people were confined in a small space on the steamer "Londonderry;" of these, 73 died. Every one knows of the "Black Hole" of Calcutta. The mortality in unventilated places is as great among animals as among men. Fifty years ago the yearly mortality of the French cavalry horses rose as high as 197 per 1,000. A few years later, when the stables were properly ventilated, it fell to 27½. The Prussians pay much attention to ventilation: among their cavalry horses it is only 15 per 1,000.

Some time ago, in the Zoölogical Gardens, in London, a new room was prepared for monkeys, which was warmed but imperfectly ventilated. Sixty healthy monkeys were placed in the room; of these, in a month, more than fifty had died of consumption, and the rest were sick. The room was then properly ventilated, when it at once became salubrious. Were it necessary, examples like these might be greatly extended.

Let us now consider what we mean by pure air; what the atmospheric impurities deleterious to health are; the effects that they produce; the ways of detecting them; and finally, how we may avoid them.

AIR AND ITS IMPURITIES.

Pure Air.—Air that is blowing over seas, and on mountains of considerable altitudes, is the purest with which we come in contact.

Such air is composed volumetrically as follows:

Oxygen,	20.96 per cent.
Nitrogen,	79.00 per cent.
Carbonic acid,	.04 per cent.
Water vapour,	Variable.
Ozone,	Traces.
Mineral salts,	Traces.
Organic matter,	Traces.

City Air.—The air of cities, in parks, open spaces, and broad streets, in spite of pollution from many sources, is, in respect to the proportion of its gaseous constituents, nearly identical with country air. This seems but natural when we consider the continuous dilution and rapid changes of the atmosphere produced by the vast volumes of fresh air which are constantly being moved by the winds; by the cleansing action of the rain in dissolving out and bringing down the gaseous impurities met in its passage, and its thorough washing out of the air of all suspended matter; by the oxidation of oxidisable materials by oxygen and ozone; and by the action of plants in breaking up carbonic acid, setting free oxygen, and storing up the carbon to form new cells.

The main difference in the gaseous composition of the city air and pure air is, that ozone is rarely found in the air of large communities. Ozone is oxygen in another and highly active form, and possesses great oxidising power. Normally, it is present in pure air in minute quantities only. In the air of cities it comes in contact with so many oxidisable substances that it is exhausted and disappears before it reaches our lungs. The peculiar freshness and vitality of the air which we experience on the ocean and in the country are due, probably, to the presence of ozone in those localities. Air which habitually contains no ozone may be considered to be adulterated.

When, however, we examine the air of narrow alleys, or enclosed courts, or streets bordered by lofty buildings, where the circulation and renewal of air are impeded, and especially

where the sun does not shine, we find that oxygen is somewhat diminished, and that carbonic acid is considerably increased. And this, it must be remembered, is the air that many people constantly are accustomed to breathe. Such air is distinctly vitiated.

There are, however, other classes of impurities in the air of cities which are of more importance. These are the temporary suspended matters which go under the name of dust. Dust consists of a great variety of matter, both organic and inorganic. It is the organic matter composed principally of vegetable material, both living and dead, that principally concerns us. Pollen of grasses and flowers, fungi, and especially bacteria form the living, while the dead matter is obtained from fermenting and putrefying food, and also of the dried excreta of our domestic animals, especially the horse. So that in streets paved with asphalt or wood, the dust which blows in our faces and which we more or less inhale into our lungs, is composed almost entirely of horse droppings and bacteria.

Then, from the combustion of coal, great quantities of soot and sulphurous acid are given off. This acid is readily oxi dised into sulphuric acid and dissolved from the air by rain, so much so that in the great manufacturing centres the rain is often distinctly acid.

Air of Rooms.—We keep our windows closed a great part of the year,—during the winter to keep out the cold, and in the heated term in summer to exclude the heat, so that the circulation and renewal of air in our houses are at these times slight. The incoming air introduced for ventilation may be vitiated or not according to our surroundings ; but once in, it may become contaminated in several ways, and unless we take special pains to remove this foul air it rapidly accumulates, becomes offensive, and is a menace to health. The sources of contamination are of so great importance that they will be discussed in detail.

1. *Vitiation by Respiration.*—The average adult man, when he is quiet, gives off about .6 of a cubic foot of car-

bonic acid from his lungs every hour, and also a certain amount from his skin. When he works hard, however, the amount exhaled may be three times that amount. The changes produced by inspired and expired air are these: In passing through the lungs oxygen is absorbed to the extent of about four per cent., and carbonic acid is exhaled in about the same proportion; water vapour is given off to the amount of two pints daily, and with it a considerable quantity of organic matter. The skin is also getting rid of a smaller proportion of the same substance. This moist organic matter very rapidly putrefies, and produces the well known sickening close smell of inhabited, unventilated rooms, and the foetid odour from dirty garments on unwashed people. As it adheres to woollen goods, furniture, and moist substances, it is difficult to remove, and, as it oxidises slowly, its poisonous effects are continued for some hours. When a person in a room is sick, the organic matter thrown off is increased, and in addition pathogenic bacteria may be set free in the air, which may communicate the same disease to other inmates.

2. *Vitiation by Combustion.*—Illuminating gas, so much used for light in city houses, is a great factor in the vitiation of air, for it is usually allowed to diffuse in the room. There are a number of deleterious products from the burning of coal gas, such as fine particles of carbon, carbonic acid, and carbon monoxide (this latter an inodourous but very poisonous gas), sulphuric acid, vapour, and a few other gases of minor importance. The water gas which is now so extensively used does not contain the sulphur compounds of coal gas, but does contain more of the poisonous carbon monoxide, and so is a more dangerous gas, although all the products of gas combustion are injurious to health. A common gas-burner consuming from three to five feet of gas an hour, vitiates as much air as the respiration of three to five men; and as frequently two or more burners are used in a room at one time, the vitiation becomes quite considerable.

Lamps and candles do not produce any sulphur com-

pounds, and do not heat the air to the same extent, nor do they form as much carbonic acid as illuminating gas, and for these reasons are healthier.

Cast-iron stoves are frequently a source of contamination. They are easily heated red hot, and when in this condition they are said to decompose any carbonic acid of the room which comes in contact with the heated metal into the poisonous carbon monoxide, and also the carbon monoxide which is formed in the fire in the stove may also pass through the glowing sides. It certainly can leak through badly fitted joints, and having no smell is not readily detected. Then the very hot surface of the stove produces some change in the air, not clearly understood, but probably a burning of the exhaled organic matter. Such air smells burnt and is disagreeable to our senses, and is probably one of the causes of the headache, malaise, and disinclination to exertion experienced in such air.

3. *Vitiation by Effluvia.*—Drains, sewers, and cesspools may be rife in the production of noisome gases and still more dangerous solid ingredients. Sewer air is made up of a mixture of ordinary atmospheric air, various gases of fermentation and putrefaction, and a variable amount of organic matter held in suspension. The gases themselves, some of which are highly offensive, and some inodorous, are probably not capable of producing any definite disease of themselves, but may cause a lowered state of the system, and so predispose to disease should an exciting cause be present. It is fortunate that some of the gases are so offensive, because they act as danger signals, and turn our attention to the source of evil where their presence might not otherwise be suspected. The most important danger of sewer gas poisoning, and the active cause of the disease, lie not in the gases, but in the suspended, invisible, living, organic matter which we call micro-organisms. These are probably the real factors in the production of sewer gas poisoning. They are difficult to detect, and difficult to get rid of.

THE EFFECTS OF IMPURE AIR.

Having seen what the impurities of air in towns and dwellings are, let us study the effects that they produce.

Carbonic Acid.—Much has been written about the effects produced by excess of carbonic acid in the air; and all schemes for ventilation are based on the removal of this offending gas. Yet in itself the amount produced by respiration and combustion in ordinary dwellings is not great, and is probably incapable by itself of producing any morbid effects.

Frequently we read of death from carbonic acid poisoning in persons working at the bottom of wells, vats, mines, etc. In these cases the gas is produced at the bottom of a tube whose opening is at the top only, and where the gas, generated without currents and at the same temperature as the rest of the enclosed air, is produced faster than it can diffuse,—conditions that do not pertain to a dwelling. When first produced in a room, whether by combustion or respiration, it is lighter than the surrounding air, and rises to the ceiling. There it gradually cools, and, falling, becomes equally diffused through the room; so that, as far as carbonic acid is concerned, it is just as healthy to sleep on the floor as on a high bed.

Normally, carbonic acid is present in pure air in about 4 parts in 10,000. In inhabited ventilated rooms it is usually slightly higher than this; but in very badly ventilated school-rooms, theatres, and in private houses during evening entertainments, the proportion of carbonic acid may rise as high as 40, and even twice that many parts, in 10,000. If, however, the carbonic acid evolved is pure, as in establishments for bottling sparkling waters, charging soda fountains, breweries, etc., and in certain health resorts, as high as 150 parts in 10,000 can be breathed with impunity. So that it cannot be the carbonic acid alone in badly aired rooms that is injurious. Such being the case, why is all this importance as regards ventilation attached to carbonic acid, so that even

as small a quantity as 1 or 2 parts in 10,000 becomes a matter of much moment?

It is because that, like men, carbonic acid is judged by the company it keeps. In this case, the very bad company is the poisonous, putrefying organic matter given off by the breath and skin. For these organic matters of varying composition science has not discovered any ready, convenient chemical tests whereby their quantity and quality can be accurately measured, while there are several tests, easy and of sufficient accuracy, for carbonic acid; and as this gas increases proportionately with the organic matter, its determination becomes a convenient method of estimating the latter. So that the importance of carbonic acid is simply as a measure of the impurity of the air.

As carbonic acid increases in a room, so oxygen inversely decreases; but as the amount of decrease is usually trifling, it need not be discussed.

Carbon Monoxide.—The second impurity, carbon monoxide, which is formed by the partial combustion of carbon, and which enters the room in imperfectly burned coal gas, and especially water gas, or through overheated and leaky stoves, is very poisonous, and is especially dangerous, as it is odourless and causes no irritation to the air-passages when inhaled. It is thus unconsciously breathed, and the unfortunate person soon loses the desire for movement, and makes no effort to escape from the poisonous air.

Less than half of one per cent. in the air has produced poisonous symptoms, and one per cent. rapidly kills. When this gas burns, it burns with a blue flame, and is often seen in fireplaces and in stoves. People who blow out the gas, or who are suffocated from burning charcoal in open braziers, die from asphyxia by this gas.

Organic Matter.—Of the impurities of air, the most injurious is organic matter. A large proportion of carbonic acid, or carbon monoxide, may produce sudden death; but it is mainly to the presence of organic matter, either living bacteria or putrescent effete matter from the lungs and skin,

that diseases of impure air are attributable. Wherever large numbers of people are massed together, these impurities are liable to exist in excess.

The danger of sewer gas is probably due to similar organic matters and bacteria. When drains are badly constructed, and in cesspools, the water becomes more or less stagnant; fermentation and putrefaction rapidly take place, gases are formed, rise to the surface of the fluid, and burst, carrying up with the gas small bubbles of water, or additional sewer water comes splashing into the stagnant pool and throws a fine spray into the air, or the ascensional force of evaporation may carry up a fine mist. These minute particles of water contain micro-organisms, some of which are harmless indeed; but others are capable of setting up such diseases as sewer-gas poisoning, diarrhoea, and typhoid fever.

If these emanations are given off out of doors, they are less apt to cause trouble, as by the winds they are rapidly diluted and oxidised sufficiently to become harmless.

In-doors the amount of sewer gas which enters our rooms is comparatively small, so that the poisonous effects are apt to be insidious, and the cause overlooked. Long continued breathing of this air may produce a general lowered condition of health, and make the body less capable of resistance to concurrent diseases. The vitality becomes depressed; there is a constant lassitude, with disinclination to work, and usually lessened appetite, prostration, headache, and sometimes an obscure low fever, or sore throat, or diarrhoea. If the typhoid bacillus is present, then the victim may be taken down with this scourge.

People who live in crowded dwellings, or spend a great portion of their time in offices, schools, and factories, are more subject to chronic and debilitating maladies than those who live an out-door life, and they offer less resistance to acute diseases.

There is no doubt of the great mortality from consumption in persons living in badly-ventilated rooms. A few years ago the proportion of deaths among the soldiers of

European armies from this cause was very high; but now, owing to better ventilation, the other conditions remaining the same, the percentage has greatly fallen. In one regiment in England, when the barracks were not ventilated, the death-rate for lung diseases was 12½ per 1,000, but after efficient ventilation had been introduced it fell to 1½ per 1,000.

Parkes gives a similar example from two hospitals in Vienna. In one, very badly ventilated, of 4,280 prisoners, 220, or 51.4 per 1,000, died of consumption;—of these, 42 of galloping consumption. In the well ventilated hospital, of 3,037 prisoners, 24 only, or 7.9 per 1,000, died of the same disease. The conditions in the two hospitals, excepting ventilation, being alike, the badly ventilated one had six and a half times as many deaths, from this cause alone, as the better aired one.

Knowing as much as we do now of the bacillus tuberculosis, the exciting cause of consumption, we can see how easily it is spread in confined quarters. Thousands now who are victims of this dread malady are ignorant of the fact that every time they spit on the street, or on the floor, or expectorate into their handkerchief, they are letting loose hundreds of thousands of living, virulent bacilli; and that, as soon as the matter containing them dries, they are stirred up by one's feet, or are swept into the air by the broom; or, when the handkerchief is shaken out before a second using, the air becomes filled with these microscopic germs, ready to be inhaled and to quicken the disease in themselves, or start it fresh in some one near and dear to them. When people are already sick, the organic emanation thrown off from their bodies is greatly in excess of what takes place in health, and more fresh air is needed at those times to keep the air of a room pure. Many diseases are increased in severity, and convalescence delayed, by impure air.

TESTS FOR IMPURITIES.

Of the tests for impurities, there are but three that are sufficiently simple and easy for the average person to apply. They are,—

1. *Examination by Smell.*—The organic matters given off by the skin and breath, if allowed to remain in a room for a short time, have a characteristic odour. Persons having a good sense of smell, and coming directly into an apartment from out of doors, can readily detect this peculiar odour, and can soon learn to judge with comparative accuracy the amount of vitiation of the air; and it is possible to develop this faculty to an extreme acuteness. The air of dwellings is, as a rule, less pure than that of the outside air, so that a certain degree of vitiation is taken as a standard of impurity. Remembering that the amount of carbonic acid in pure air is 4 parts in 10,000, an additional quantity of two parts is allowed in the air of rooms. If the amount of carbonic acid is increased beyond this limit, the air is considered vitiated. This addition of two parts, *i. e.*, 6 parts in 10,000, is the standard impurity; and, as putrescent, foetid organic matters increase regularly with the carbonic acid, we can construct a table of vitiation in terms of carbonic acid. The table is this: If this gas is in an excess of two parts only of pure air, the rooms smell fresh; if it is increased to four parts, the room has a slight musty smell; if to six parts, it has a very close, oppressive, offensive odour; beyond a further addition of one part, it becomes so extremely close that the sense of smell can no longer differentiate the extent of vitiation.

To apply this test, a person should have been in the open air for at least fifteen minutes, and must then enter the room as directly as possible, for this delicate sense of smell is rapidly lost, and it takes some time in the fresh air to regain it. If the room smells fresh on entering, it contains no more than 6 parts of carbonic acid in 10,000 (the standard of impurity), and is thus sufficiently pure; but if it smells musty or close, this limit is exceeded, and it requires ventilation.

2. *Tests for Carbonic Acid.*—The simplest, that proposed by Lange, is to take a bottle of 350 c. c. (12 oz.), the bottle being perfectly clean, and fill it with water to the brim to force out the air in it; then to empty the bottle in the room to be tested, and dry it. The bottle then is full of the air you wish to examine. Then put 15 c. c. ($\frac{1}{2}$ oz.) of clear, fresh lime-water in the bottle, insert the cork, and shake vigourously for a few minutes. If the air contains 7 parts per 1,000 of carbonic acid, a turbidity of the fluid will occur. This opacity can be more easily detected by gumming a piece of white paper marked with a cross in lead-pencil to the side of the bottle; when the fluid becomes turbid, the cross will become dimmed or invisible when looked at through the water. If no turbidity occurs, the air is sufficiently pure. The exact extent of vitiation can be determined by using different sized bottles, but this one size is sufficient for ordinary testing.

3. *Wolpert's Air Tester.* The principle of this apparatus is the same as the preceding, *i. e.*, it depends on the property of carbonic acid turning lime-water turbid. It is more convenient than the former, as one bottle is used to determine all grades of vitiation.

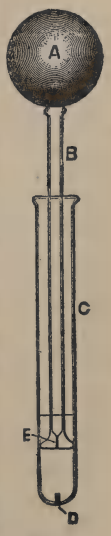

FIG. 1.

The apparatus is simple, easy to use, and cheap. It consists of a simple rubber bulb (A); a glass outlet-tube (B), with a constriction near its extremity (E). A glass test-tube (C) has a horizontal mark near the bottom, indicating the point to which it must be filled with perfectly clear lime-water. The bottom of the tube is whitened, and has a black mark stamped upon it (D). In order to use the instrument, the lime-water (saturated solution) should be poured into the test-tube till it reaches the horizontal mark. Press down the bulb with the thumb, so as to expel the air within it as completely as possible, and allow it to fill with air of the apartment; insert the small tube into the lime-water, nearly to the bottom, and again expel

the air with moderate rapidity, so that the bubbles may rise nearly to the top of the tube, but do not overflow, taking care to continue the pressure of the thumb till the small tube is removed from the lime-water. Repeat this process until the mark upon the bottom of the test-tube is obscured by the opacity produced by the reaction of the carbonic acid upon the lime-water, the observer looking downwards through the lime-water from the top of the test-tube.

With very foul air, it is necessary to examine the mark after filling and discharging the bulb a few times only; with good air, it must be filled twenty-five times and upwards. A table accompanies the apparatus, so that, without calculation, the result can be directly read.

VENTILATION.

Money is the foundation of perfect ventilation. If expense is no object, it is easy to ventilate a house; but in dwellings with small rooms it is impossible at the same time to have good ventilation, sufficient warmth in winter, and cheapness. One of the three must suffer, and it is usually ventilation.

To the people who live in houses where no special forms of ventilating apparatus exist, and who are unable to procure expensive appliances, this paper is directed, its object being to explain the more important principles of ventilation, and to point out the simplest and best ways of keeping the air of inhabited rooms pure at a moderate cost and without expensive apparatus.

The aims of ventilation are,—to prevent air which is puffed out of one person's lungs from being breathed over again by the same or another person; to remove the products of combustion; and to maintain an equable and comfortable temperature,—and all this without creating draughts. With two or more persons in the room, especially in winter with lights burning, this is almost impossible. The best we can do is so to dilute the impurities that they will not exceed the standard of vitiation.

The purity of air in a room depends on several factors,—

the source of the air, the amount of cubic space for each individual, the natural movement of air, the size and the position of the inlets for fresh and the outlets for foul air, the methods of heating and lighting, and the humidity.

The Source of Air.—The primary condition for ventilation is, that the incoming air shall be pure: it must be pure external atmosphere. Air that is drawn from small closed courts, or from between back-to-back buildings, or that has blown over refuse, or that rises from a cellar, is unfit for continuous breathing. The sun rarely or never visits these spots, and the winds get no chance to sweep through them. Especially bad is the cellar air, as cellars are apt to be damp, mouldy, and dark, and are frequently polluted by decaying vegetables and the ash-heap; and currents of air are constantly passing through them from the soil below, so that sewer air from defective drainage in the neighbourhood may easily enter and be sucked through the house. This danger is particularly great if the house is heated by a furnace whose wooden air-box passes through the cellar.

Cubic Space.—The amount of space which should be given to each individual in a room is a matter of much importance. Many people believe that if a room is large, less fresh air is necessary. But no matter how large the room, the air in it must be used up in a few hours at most, and it then requires the same amount of pure air per hour for each individual as a small room. A large room is, however, preferable, because in it sufficient air for ventilation can be more easily introduced, broken up, and warmed, without creating draughts, than in a small one; and the larger the room the greater the surface of wall and number of windows, and, therefore, the greater the insensible ventilation.

Out of doors there passes over a man, when the wind is gently blowing, 196,000 cubic feet of air an hour. In order that that much should pass over the same individual in-doors, the entire air of the room would have to be changed from two to six times a minute, which is practically impossible, as nobody would stand such a current. Such large amounts of

air are not, however, necessary. Sanitarians are agreed that each adult individual requires at least 3,000 cubic feet of air every hour, and this must be supplied without perceptible draughts. A room 10 x 15 x 20 feet holds 3,000 cubic feet of air. The air of such a room must be entirely changed once every hour in order that one individual shall have the required amount of fresh air. If three persons are in the room, it must be changed three times during the hour. Complete renovation of air cannot be effected much more frequently than this, because if we attempt it we meet with one of the greatest difficulties in ventilation, namely, draughts. If air is moving more than 2½ feet a second we are sensible of it, and call it a draught, so that one of the problems of ventilation is, to supply a proper amount of air in a room at a speed that shall not exceed 2½ feet a second. If the room is small, we frequently cannot do this.

Diffusion.—The gases in air are never at rest, but are moving about among themselves inversely as the square root of their density. They are not deterred in their movements even by brick wall or plaster, but pass fairly readily through these when there is much difference in temperature between the inside and outside of the building, and especially when there is a wind. Painting, papering, and damp walls, on the other hand, reduce very greatly their permeability. Through the chinks and crannies about doors and windows, and in floors and walls, the air rapidly diffuses. The occupants of many rooms depend almost entirely on these chance openings for their supply. Unless the room is a very large one, with several windows and doors, the supply introduced by these sources is inadequate as regards the gaseous constituents; and the organic matter and bacteria are scarcely at all removed, as they cannot pass through walls, and in the comparatively still air of the room they soon settle to the floor.

The Action of the Winds.—Where the direct action of the winds can be applied, they exert a tremendous power in changing the air of rooms. They act by perflation and aspi-

ration. We make use of the perflating action when we open the windows and doors, and allow the air to blow freely through. The room is thus rapidly flushed out, and the air is by this means renewed many times an hour. But while this agent has such great power for good, yet it is difficult to control, it being frequently too strong, especially so when the temperatures inside and out are widely different; and, again, there may be a total calm,—so that this force cannot solely be relied upon for inhabited rooms. The wind also acts by aspirating, *i. e.*, a current in passing through the air causes a partial vacuum along its sides, and thus sucks the neighbouring air towards itself. This force is taken advantage of in chimneys, for when the winds blow over the mouth of a chimney it draws air out from the inside, and thus, creating a partial vacuum in the tube, air is sucked up from below to supply its place. If the top of the chimney, however, be below the level of the surrounding buildings, the wind may then blow down the chimney, creating a back draught and making the chimney smoke.

FIG. 2.—Diagram illustrating down draughts.

Movements Produced by Unequal Weights of Air.—When air is heated it expands, and if it can escape a portion will do so, so that what remains will be lighter, bulk for bulk, than the colder air outside. As it is lighter than the surrounding atmosphere it rises through it, and the cold, heavier air rushes in from all sides until the weights outside and in are in equilibrium. It is this property of unequal weights of air that causes winds. This force is largely relied upon, especially in winter, to ventilate houses in this climate. Most of our homes are provided with chimneys and fire-places. During cold weather, when people are in a room with lights burning, whether other artificial heat is provided or not, sufficient heat is generated to raise the temperature of the room above that of the outside air. It therefore expands, and ascends

through the chimney, and the cold air, even though the room be closed, filters in through all sorts of apertures to supply its place. It thus acts as a very valuable ventilator. The rapidity with which air passes up the chimney is dependent on a number of factors,—as, the height of the chimney, its shape, area, the material of which it is composed, whether it is straight or crooked, the difference in temperature inside and out, and on friction. All these factors must be taken into consideration in determining the rapidity of flow; but as the calculations are rather complicated, they will not be introduced here.

Inlets and Outlets.—No scheme for ventilation can be efficient that does not supply an abundance of fresh air in a scientific manner. The cheapest and most thorough way of accomplishing this object is to open wide the windows and doors; and this should be done whenever the temperature is favourable: when practicable, these make the best inlets and outlets. But in this climate the windows must be kept closed a great part of the time in order to keep warmth in the room. Other means, therefore, have to be employed to supply the necessary fresh air. In providing inlets a number of things have to be taken into consideration. The inlets must be so placed that the air cannot blow directly on the occupants of the room, and they must be of such size that sufficient incoming air is obtained without a high velocity; for, if the movement is greater than two or three feet per second, draughts are experienced; and besides, a slow current is more favourable for uniform diffusion than a rapid one. If it can be avoided, air should not enter through openings at the level of the floor, as dust readily falls into the openings and fouls the air; and if the incoming air is cooler than the temperature of the room it chills the feet. The place of admittance of cool air should be above the heads of the occupants, and means should be taken to diminish the current if too rapid, and the flow should be directed upwards, as there, meeting the warmer air of the ceiling, it mingles with it, becomes warmer, and gradually spreads through the

room. The external openings of the inlets should give on a place where the air is uncontaminated. They should be short, and so arranged that they admit of ready cleansing. They should be numerous and small rather than large and single, as they are thus less liable to cause draughts. The ends inside should flare to help check the momentum of the current and favour diffusion. Externally they should have filters to keep out the dust, and to prevent the wind's blowing in too strongly. Inside they should have valves, to close them if necessary during very cold weather or high winds. They must not be placed too near an outlet, as the air could easily pass from one to the other without diffusing.

Air finds its way, as before mentioned, through numerous unintentional and unnoticed inlets, as cracks and crannies, and even through the solid wall. The intentional inlets, however, are made either in the windows or in the side walls, ceilings, or floors.

Inlets through a Window.—When the conditions are such that the window cannot be freely opened, it can be arranged in one of several ways to provide sufficient fresh air.

Hinckes-Bird's Method is the simplest. This consists of placing a movable block of wood (A) under the entire length of the lower window-sash (B), thus raising the top of the lower sash above the bottom of the upper. By this procedure considerable space between the two window-frames is left, through which the incoming air freely passes, and being impelled in an upward direction it causes no draught.

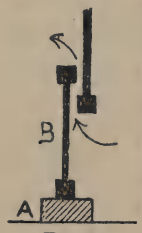

FIG. 3.

Tobin's Tube Modified.—In Tobin's tube the air from outside enters through a hole in the wall, and is conducted by an upright tube into the room. The opening of the tube is above the heads of the occupants, and the air escaping ascends towards the ceiling. It is an excellent method of admitting fresh air, but it is ugly and somewhat expensive. This

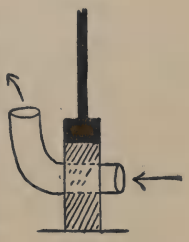
FIG. 4.

method is not much used in this country, but, instead, a board is placed under the lower sash through which pass bent tubes: these admit the air in an upward direction. The principle is the same as in Tobin's tubes, but they have the advantage of simplicity and cheapness, and are just as good.

Auger Holes.—The above principle can be further simplified by boring a series of holes with an auger in a perpendicular direction through the bottom of the upper sash. These holes admit a considerable quantity of air in an upward direction, and can be closed at will with corks.

Canvas Windows.—A frame can be made the size of the upper sash, and covered with a light, loosely woven canvas. The upper sash then being lowered, this canvas frame is inserted in its place. There is a considerable exchange of air through this device, and the circulation is so slow that there is no draught. It is valuable in a sick-room, and is inexpensive.

Wire Screens.—A similar device can be made of fine wire netting instead of canvas. It allows air to pass more freely through than the canvas screen, and is very valuable when the weather is mild and the wind is not too strong.

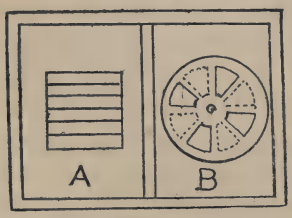

FIG. 5.

(A) *Louvres.*—One of the panes of glass can be lowered, and air admitted by this means in an upward direction.

(B) *Cooper's Ventilator* consists of a series of apertures in a window pane arranged in a circle, which can be partially or entirely closed by a glass disk movable on a pivot, with corresponding apertures. This method does not direct the current upwards, and it allows of a draught. The last two methods are rather conspicuous, and are not much used.

FIG. 6.

(C) *A Double Pane* may be used. The outer one is open at the bottom, and the inner one at

the top. This is practically Hinckes-Bird's method on a small scale.

(D) *Hinged Pane.*—One of the panes of glass may be hinged at the bottom, and allowed to fall inwards a short distance, excessive motion being hindered with side checks. This is a good arrangment, especially if the sides are closed in. It is thus converted into a Sheringham valve.

Temporary Sheringham Valve.—In private houses during parties the rooms often become insufferably hot and close. These unpleasant features can to a great extent be avoided by having a temporary Sheringham valve constructed of wood and canvas, and inserted above the upper sash of the window, which is lowered for the purpose.

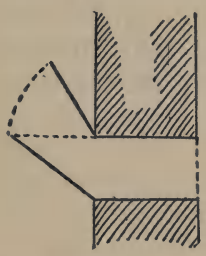

Fig. 7.

Sheringham Valve.—This is the most generally used form for inlet. It consists of an opening through the wall for the air to pass, the entrance being usually guarded by a strainer of some sort, to keep out dust. On the inside is a valved iron plate with closed sides and hinged at the bottom. An attachment is arranged to more or less completely close it. The entrance should be a little smaller than the exit, that the velocity of the current into the room may be diminished. It is usually placed near the ceiling.

Tobin's Tubes are usually placed in the corners of rooms. They take their air-supply directly from out of doors, as in the Sheringham valve. They have already been described under window ventilation.

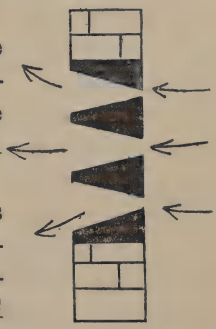

Fig. 8.

Ellison's Conical Bricks.—These are bricks with conical holes in them, the small openings being on the outside. By this arrangement the incoming air is widely distributed in every direction, and is thus prevented from causing as direct a draught as if the openings were of the same size all through. They, and in fact any openings

which do not direct the current upwards, are apt to cause a very disagreeable current to flow down the adjacent walls. The cold air seems to cling to the walls, and descends like a douche.

This cold air shower is frequently encountered in churches, or in rooms where the windows are high, by persons sitting near the wall beneath the open windows.

Hollow Ventilating Beams are sometimes, though rarely, made use of as inlets for fresh air. The hollow beam extends across the house from one external wall to the other, being open at both ends and having numerous openings into the room. They are divided, however, in the middle by a partition, so that they act at the same time both as inlets and outlets.

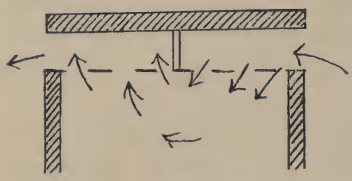

FIG. 9.

Mackinnel's Ventilator is founded on rather a curious property of air. It has been found, when a room is closed (that is, without visible inlets or outlets), and an opening is made in the roof and a tube inserted, that the ventilation of such a room is very poor. Sometimes the air descends in puffs, and sometimes the heated air of the room rises through the opening. There is no regularity about either current, and the two currents do not take place at the same time. If, however, the tube be divided longitudinally from top to bottom, a continuous current descends through one tube, and ascends through the other. Mackinnel's ventilator is an improved application of this principle. It consists of two tubes, one inside the other, both ends

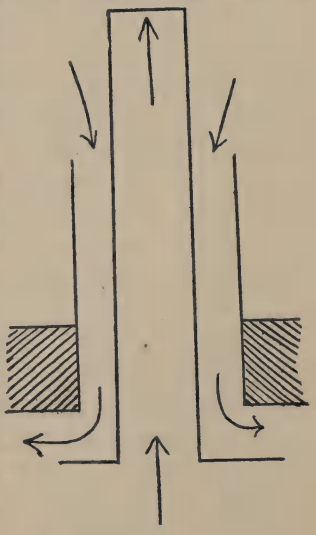

FIG. 10.

being open. The inner tube is the longer, projecting above the outer at its upper end, and below it at its lower, where it is bent at right angles. The inner tube, as it is the longer, is the exit tube, and the outer becomes the inlet. The air coming in strikes against the flange of the longer inner tube, and is directed towards the ceiling and diffused.

Outlets.—The location of the outlet is very important, for on it depends the position of the inlets. If the air passing through the outlets can be heated, they may be placed anywhere. If not, they should be near the ceiling, or, if the room be domed, at the highest point of the dome. They should not be in the external walls if it can be avoided, as the air may become cooled in them, and then they will not draw well. They should be smooth and straight to reduce friction, and should be suitably covered to prevent rain's entering, and to help aspiration as well. If the air in the extraction shaft can be warmed, it is much more certain in its action. Under certain circumstances, which circumstances we will discuss a little later under the head of back draughts, all the above inlets may become outlets.

Extraction Tubes.—Frequently small tubes are run from the top of rooms, and especially from toilet rooms, for the purpose of ventilation. Usually they fail properly to accomplish this purpose, for the reason given under the head of the Mackinnel's ventilator, and they are very liable to produce down draughts if there is an open fire-place in the house. So that the air from these rooms, instead of passing up the ventilator, is drawn through the living rooms to the chimney of the fire-place.

Open Fire-Places.—A chimney with an open fire under it is, under most circumstances, the best outlet. In ordinary dwelling-houses, if proper inlets are provided, no other outlets are needed. It is very important, however, that the chimney should be of suitable size to change the air of the room sufficiently often, but at the same time the current of air passsing through it should not be so strong as to cause a draught of air in the room towards it. Neither should it be

too large, as it is then wasteful of heat and is liable to cause a back draught and to smoke.

Arnott's Valve.—In rooms as usually constructed, with a fire-place and without other attempts at ventilation, it is found, especially when gas is burned in the room, that part of the heat and foul air goes up the chimney and part rises to the ceiling. In order to remove the products of combustion and the impure air, outlets may be made into the chimney flue near the ceiling. Arnott has constructed an opening and valve for this purpose, which permits the warm, bad air to pass into the flue, but prevents the reflux of smoke from the chimney into the room.

Outlets Warmed by Gas.—When we wish to use the chimney for purposes of ventilation, and an open fire is not available, we can heat the chimney or outlet shaft by burning a gas jet or a lamp in it. Either of these will warm the air sufficiently to cause an ascending current, producing an outlet.

Sometimes openings are made in the ceiling over a chandelier, which connect with an outlet tube, and which permit the escape of the products of combustion. This is an excellent method for the purpose, but is unfortunately rarely made use of, except in large public rooms, theatres, etc.

Back Draughts.—There are a number of causes of this annoying complaint, as,—

Too large a flue, the smoke going up one side and cold air down the other, the currents acting as they do in a Mackinnel ventilator.

Insufficient supply of air to the fire in a closed room. When the fire cannot draw air freely from the room, it sucks it down the chimney in fitful gusts to supply the deficiency, and fills the room with smoke. When this occurs, slightly opening the window will cure the difficulty.

Winds may blow down when the chimney is not capped, or when the top of the chimney is below the ridge of the house or lower than neighbouring buildings (see page 21).

One heated chimney may draw air down unused chim-

neys in the same house if all the doors and windows are closed.

Rain may get into the shaft, and by evaporation cool the air in it. This air, becoming heavier than that in the room below, descends.

When the fire is first lighted, and before much heat is evolved and an up-draught established, the superincumbent heavy atmosphere in the shaft forces down the smoke.

A large hall and staircase running from top to bottom of a house and having an outlet on top may act as an enormous aspirating shaft drawing air to itself down the chimneys and from every room.

Methods of Heating.—Theoretically, we favour ventilation; practically, we dislike draughts. So that, while every one acknowledges that good ventilation is a desideratum, yet, as it frequently conflicts with our methods of heating, and is apt to produce cold-air currents, it is often neglected. No one, in order that he may breathe a pure atmosphere, is willing to sit in a draught; neither will any one remain shivering in a cold room for the sake of fresh air.

During the winter, in this country at least, our rooms must be artificially heated, so that it will be wise to review the different systems of heating in order to determine what the most desirable method is that will ensure at the same time warmth and efficient ventilation.

Oil Stoves or Gas Stoves.—Rooms are sometimes heated by one of these means. Of all principles of heating it is the worst, as oxygen is used up, and, instead of being removed, the products of combustion are added to help vitiate the air.

Cast-Iron Stoves.—This is the cheapest method of producing heat, and the only one available to a great mass of the population. As the stove can easily be raised to a red heat, it becomes dangerous from the carbon monoxide which may be formed. It burns some of the organic matter in the air, producing a peculiar, disagreeable odour. Unless pans of water are on the stove, the air of such a room is apt to be too dry. It heats very quickly; but as it cools as rapidly,

the temperature in the room is not apt to be uniform. If not over-heated, it does not appreciably vitiate the air of rooms. It should remove its own products of combustion; to a slight extent it renovates the air of the room. It is much better than the gas or oil stoves.

Non-Ventilated Steam and Hot-Water Radiators.—In these systems the heating coils are placed in the room, but without any special means of supplying fresh air. These radiators are more convenient for many reasons than a stove. The heating surface never becomes so hot. They occupy less room. Except that the steam-coils burn the organic matter in the room, they do not vitiate the air. The air is, however, somewhat dryer than stove-heated air. The heat can be shut off and renewed more easily than in a stove. They are somewhat better than stoves, but are much more expensive.

Furnaces.—The air from a furnace is not so apt to be overheated as that from a stove. The pipes may, by the aid of several openings in one room, distribute the heat more evenly. They bring heated, presumably fresh, air to the room, instead of heating the more or less tainted atmosphere that is already present. As it is constantly introducing fresh air, the foul air must be as constantly escaping. It does not occupy space in a room. It is better than stoves, or unventilated steam or hot-water heating.

Ventilated Steam or Hot-Water Radiators.—When outside fresh air is passed over the radiators before it enters the room, it makes an admirable method of both heating a room and supplying fresh air. In large buildings steam or hot-water pipes are more easily distributed and occupy less space than furnace flues. For large buildings they are also cheaper.

Open Fire-Places.—This method differs from all the preceding systems in two important particulars. It warms by radiation instead of by convection. It affords an excellent outlet for the foul air of the room.

An open fire-place warms by first warming the walls, floor, ceiling, and furniture of the room, and they in turn warm

the air. In this system the air of the room is usually cooler than the articles in it. It is the pleasantest form of heat, and the glowing fire is cheerful to look at. It is the most healthful; for while it heats, it does not add any impurities to the air of the room. It is also a powerful ventilator. Open fire-places have, however, disadvantages. They are wasteful of fuel. They cause draughts. They do not heat the room uniformly. Frequently, in standing in front of a fire, one's face is too hot, while at the same time one's back is chilly.

The intensity of radiant heat is inversely as the square of the distance. Thus, if of two objects one is one foot and the other ten feet distant from the fire, they will be warmed respectively in the proportion of one and one-hundredth.

Ventilating Fire-Places.—These are marked improvements on the ordinary fireplaces. They have all the advantages of the latter, and in addition they prevent draughts of cold air by sending into the room air that is partially warmed. Fresh air is admitted to the back of the grate into a chamber which is warmed by a large heating surface, and, being carried up by a flue, discharges into the upper part of the room. There are a number of different kinds of ventilating fire-places and ventilating stoves made. The merits claimed for these improved fire-places are,—

1. That they ventilate the room;

2. That they maintain an equable temperature in all parts of the room, and prevent draughts;

3. That the heat from radiation is thrown into the room better than from other grates;

4. That the fire-brick lining prevents the fire from going out, even when left untouched for a long time, and prevents the rapid changes of temperature which occur in rooms in cold weather from that cause;

5. That they economise fuel, partly by making use of the spare heat, which would otherwise pass up the chimney, and partly by ensuring by their construction a more complete combustion, and thereby diminishing smoke;

6. That they prevent smoky chimneys by the ample sup-

ply of warmed air to the room, and by the draughts created in the neck of the chimney.

Fire-Places and Ventilating Hot-Water Radiators.—In the houses where it can be applied, this double method of heating is the best way of combining warmth with ventilation. It is of course the most expensive. The hot-water system is preferred to furnace or steam-heating, for the reason that the heat is supplied at a much lower temperature than by either of the others. Air from a furnace is frequently delivered in a room at a temperature of 150° F., while it is almost impossible to heat the air passing over hot-water tubes to any such degree of heat.

If one bear in mind the various principles that have now been laid down, there should be no particular difficulty in arranging inlets and outlets, and of so using the method of heating at hand as to be able to obtain pure, fresh atmosphere, to distribute it properly, to breathe it warmed, and finally to remove the impure air.

MENTAL THERAPEUTICS.

By Henry D. Didama, M. D., of Onondaga County.

October 30, 1891.

Some people hold that the mind is a product of the brain, as bile is of the liver. Others believe that it is something implanted, spiritual in its nature, and capable of an independent existence. Fortunately, considering our limited time and superabundant material, an attempt to decide this question forms no part of the paper which I am to read. And yet, as everybody on the eve of a critical election (every election, as is well known, being specially critical) is ready to display his colours, you will pardon me for confessing that, somehow, I find an incentive, a stimulus, a comfortable hope in the doctrine that the ego which is conscious, which thinks and judges and wills and loves, is something more and better than a complex, mortal, glandular secretion.

The intimate connection between the mind and the body, and their action upon each other for good or for evil, are everywhere known and acknowledged. And, consciously or unconsciously, mental therapeutics has been a factor in the treatment of bodily diseases from the earliest period of history, is now, and will continue to be, till human suffering comes to an end.

I venture to call your attention to a few instances where the phenomena were apparently from mental action exclusively, to some where the results may be attributed to the combined influence of mental and physical causes, and to some erroneously classified. I dare say that you will recognise nearly all of them as familiar acquaintances.

Thirteen hundred years ago, Alexander of Tralles, a learned man, esteemed in his time as a star of the first magnitude, cured numerous cases of colic by the use of a stone on which

was engraved Hercules strangling a serpent, according to some authorities, and, according to others, a lion (no one, so far as I am able to discover, claiming that Hercules or Samson ever had the temerity to engage in the modern attempt to throttle a tiger). For attacks of intermittent fever, this same shining light advised his patients to carry in their pockets olive leaves on which were written the mysterious words, "Ka, ra, a." In our day, the more simple, and yet perhaps equally effective, horse-chestnut, without any inscription, is carried by many people, of good character and excellent business habits, to ward off their besetting sin of rheumatism.

One thousand years after the death of the brilliant Alexander, William Butler, of County Clare, in Ireland, a favourite of King James I and of the celebrated Helmont, claimed to have discovered another stone, of such wonderful power that it would cure all dangerous diseases. And one of the peers of the realm, after a careful investigation, became convinced of the truth of the claim.

About this time, Francis Anthony, an alumnus of Cambridge, announced that by the use of a potable gold which he had discovered he was able to cure *all* diseases, whether dangerous or not. Anthony, however, seems to have been but a copyist or a re-inventor, for, a hundred years prior to his time, Ficinus, of Florence, called *his* potable gold the true elixir of life.

It is just possible that these statements will call to mind the discovery, by a French savant—two hundred years after the days of Anthony—of a rejuvenating animal elixir of life, and also the well attested (as usual), wonderful, and numerous cures of confirmed inebriety and morphinism recently effected near Chicago, the Keely motor being the same old *aurum potabile*, harnessed this time, however, with some other drug, as yet carefully concealed.

Animal magnetism, introduced by Mesmer in 1774, scouted by the profession generally, yet earnestly advocated by several eminent physicians in Europe, had its periods of popular favour and popular eclipse for a cycle of a hundred years.

Hypnotism, the new candidate for professional investigation, notwithstanding its repudiation of the magnetism, the telepathy, and the clairvoyance claimed for mesmerism, has many of the traits of its obsolete predecessor. Indeed, these sciences resemble each other so closely, in feature and manifestation, that they almost merit the title of the two neurologic Dromios.

Professor Albert Moll, of Berlin (it is safe to call everybody professor nowadays), in the second edition of his work on Hypnotism, just published, claims not only to induce the hypnotic condition by the well known mesmeric manipulations, but to dispel it by the ancient reversed passes, with the back of his hands towards the subject; as if, after all, he really believes that from the dorsum an influence emanates which is the very opposite of that which resides in the palm.

For more than five hundred years all sorts and conditions of men, women, and children, thousands upon thousands in number, sought to be cured of real or imaginary scrofula by the Royal Touch. That the touch was efficient, in spite of the later proclaimed disbelief of the monarchs themselves, we have the testimony of numberless witnesses. And so late as the eighteenth century the common people of England were instructed to rid themselves of epilepsy by touching the hand of an executed felon. Westinghousecution having abolished the public gallows, all miserable epileptics must fain be content now with the dubious bromides, or with the infallible myotomies of the oculist.

It is within the memory of many that cancer was to be brought to a blissful termination by the use of condurango. In the good old days when wisdom and economy prevailed, the legislature of the state of New York paid five thousand dollars for a remedy for hydrophobia, of which the infallible efficacy was attested by overwhelming evidence. The Metallic Tractors, which Perkins, of Connecticut, patented a hundred years ago, actually did cure—if abundant testimony is to be credited—hundreds of cases of neuralgia and other ner-

vous affections by being gently drawn over the affected parts.

Shortly after the discovery of America, rejuvenation by using the blood of children and youths, not hypodermically nor by transfusion but as a beverage—after the manner of Jack the Giant-Killer—was proposed and zealously advocated by the same Florentine physician who discovered the golden *elixir vitae*. History is silent as to the reception of the proposal. We can readily believe that while it might have been hailed with great delight by the sere and yellow octogenarians, there was no irresistible clamour for its adoption by the parties of the second part,—the infants and young children.

The temples of Aesculapius were erected in groves, or on the declivities of Grecian hills, or where medicinal springs abounded. At the entrance of these sacred resorts the white-robed priests and their graceful daughters recounted to each new patient the wonderful cures effected by the god in answer to prayer, conjoined with the faithful use of his medicines. Recovery showed that the will of the god had been obeyed, and votive offerings were justly in order; while the blame for non-success rested properly on the failure of the patient to understand, or neglect to observe, the wise directions.

Now, what do we think of the specimens so far presented, taken at random from scores of similar ones? What shall we say concerning the results alleged to follow the employment of unmixed mental therapeutics? Grant that the operators were in many instances—in most, if you please—lying or self-deceived impostors, and that the great majority of the patients were credulous dupes (whose progeny abound to this day): what is our opinion of the testimony volunteered by a respectable minority as to relief afforded and cure effected?

False diagnoses were intentionally made in the olden time, as now, by local and perambulating quacks, and by sincere but ignorant pretenders; and then, as now, the populace often made their own diagnoses, which, although likely to

be incorrect and worthless, were regarded by themselves as unerring. To-day, to furnish a common illustration, a reddish urinary sediment in the morning vessel is regarded as conclusive evidence, to multitudes of intelligent but unknowing people, that they are afflicted with genuine Bright's disease; and they furnish reams of certificates and affidavits that they have been cured of this dreadful complaint by a simple and safe alkaline diuretic, enormously advertised; when any physician could have informed them that there was no kidney disease of any kind, and that a goblet of water at bedtime would have kept the natural waste material in solution and prevented the alarming deposit. Now it is known—as it was not known in bygone times—that many diseases have a regular course (usually a favourable one), and that, while watching and waiting are important, medication is not needed to secure a successful issue, and is impotent to shorten the duration of the case. Recovery in these self-limited diseases is too apt to be attributed by the laity—never, however, by an educated and upright physician—to the unimportant potions administered. Daily observation must convince us that popular opinion on any scientific question is not infallible.

Let us examine some of the specimens presented. Fraud is an element in not a few of the wonderful manifestations. Our good New York friend, Dr. B——, you all remember, after his conversion from implacable skepticism to the hypnotic faith, went, with his two trained and trusted assistants, on a missionary tour to the medical agnostics and scoffers of London town. Discomfited and crushed by the confessed conspiracy of his associates, he returned a sadder and a wiser man.

Alexander's colic might have subsided without the use of the pebble, and the fevers might have run their favourable course unassisted by the inscribed olive leaves. The good William Butler, of the County Clare, may have overestimated the potency of his rocky fragment, notwithstanding the credence which the saintly King James gave to his pretensions.

And the same admission may be made concerning the potable gold employed by Anthony and by the Florentine celebrity. (We may suspend judgment for a while regarding the Western variety.)

It is safe enough also to conjecture that the great mass of those who flocked to feel the coveted touch had no scrofula, or even temporary enlargements of cervical glands. Still, we know from personal observation that genuine cases of consumption were benefited for a time by Bergeon's gas enemata, and that true cancer put on an improved appearance—transient, indeed, but unmistakable—under the use of condurango. The chief enthusiastic advocate of the remedy has passed away, the herb itself is no longer in the market, and carcinoma still successfully defies all medical attacks.

There was some virtue in the specifics of Joanna Stevens for the cure of calculus, or they would not have received the commendation of many distinguished London surgeons in the middle of the last century. This opinion is fortified by the fact that the conservative British parliament, yielding to popular demand and professional acquiescence, paid the thrifty Joanna twenty-five thousand dollars for her precious prescriptions.

Dr. Haygarth, of Bath, exposed and ended the so called imposture of the Perkins Tractors, by showing that wooden ones produced results identical with those effected by the original instruments of brass and steel; but he never denied that when the manipulations were made with either kind, pain subsided, and the apparent inflammation disappeared.

I can vouch for the truth of the following occurrence: Mrs. M., a worthy and industrious woman, who, after an attack of some mild disease, had to all appearance perfectly recovered, continued to remain in bed, in spite of all entreaties and demands, for six long years. She was under the care of a legal practitioner, whose pellets had the negative virtue of being harmless. In this case they were useless also. One day a shrewd mountebank came along, heard the history, prayed audibly and vehemently in the presence of the

patient, and then sternly commanded her, in the name of Jesus Christ, to rise and walk. The good woman rose instantly, dressed herself, came down stairs without help, and walked past my house, several blocks distant, the same afternoon.

This case of Mrs. M. attracted not a little attention in her neighbourhood, and the peripatetic operator was regarded by the credulous as a miracle-worker. The authoritative suggestion overcame the paralysis of the woman's will, and recovery took place at once. Many similar cases have been reported where an equally prompt and permanent cure was effected by a sudden shock, such as the occurrence of a fire on the premises, and even by a false alarm of one in the vicinity.

In the treatment at the temples of Aesculapius, the outcome of suggestion was expectancy. Baths and friction, alternate exercise and repose; appropriate diet and medication did the rest.

The remedy for hydrophobia, bought by our sapient legislators, was never used after its composition was made public, although it contained, among other potent ingredients, calcined oyster shells, the marrow of a hog's jaw, and verdigris obtained by soaking in vinegar a penny of the reign of blessed Queen Anne. So when Joanna's prescriptions for stone in the bladder were made public: the invariable result followed. The remedies recommended were seen to be inferior to those in common use, and they hastened into merited oblivion.

Alas and alas! that the unpitying logic of history should evermore continue to crush the tender buds of our most promising hopes. The Matchless Sanative of sixty years ago, one drop of which sent the blood tingling to the finger tips; the precious golden drops; the miraculous stones; the Yankee Tractors; the blue-glass cure of Pleasanton; the glandular emulsion,—these and a multitude of their kindred, whose efficacy was guaranteed by a cloud of witnesses, have all vanished from the face of the earth. The divinity which

doth hedge a king did not really ooze from his fingers and cure scrofula, else why should the Royal Touch have given place to iron, strychnia, and cod liver oil?

Some errors have a most tenacious constitution. Confidence in the Royal Touch persisted for half a thousand years. Belief in the potency of infinitesimals is still alive, although nearly an entire century—and that the nineteenth—has passed away since the birth of the delusion. Individual falsehoods, indeed, must die at last, and truth—with the eternal years of God in her favour—is immortal. But credulity is also perennial. Charlatanism to-day reaps harvests as ready and abundant as any found in the darkest ages.

In the treatment of calculus by Joanna, in the rejuvenation by Ticinus, in the temple service of Aesculapius, there was, as we see, a happy union of physical and mental therapeutics. To the favourable results, however, following the use of sympathetic powder and weapon ointments which extended quite to the seventeenth century, mental therapeutics can lay no claim whatever. The delectable salve of Paracelsus—the most famous of all—was composed of the fat of very old bears and wild hogs, carefully rubbed up with roasted angleworms; moss scraped in the waxing of the moon from the skull of a person hanged; blood-stone; the dried brain of a wild hog; red sandal wood; and a fragment of a human mummy. The directions for the use of this astonishing ointment, furnished by the illustrious Bacon, are, "Wash the wound with clean water, close it carefully, apply a bandage, and leave it undisturbed for seven days. Anoint the weapon which inflicted the wound every third day or oftener, keeping it closely covered in the meantime from the air."

What a weary pilgrimage through deserts of healing salves which did not heal, of calming lead plasters and lead lotions, of oil and wine, of stimulating and antiphlogistic liniments, of water hot and water cold, and water medicated with worthless arnica and all manner of antiseptic drugs, water com-

presses and baths and irrigations, has surgery wandered, generation after generation, to come back at last to the simple aseptic dressing which Bacon commended three hundred years ago.

I must detain you with no more instances nor explanations. I end as I began. Consciously or unconsciously, but unavoidably, every worthy physician employs mental therapeutics in his daily practice. It enters into every prescription he writes, into every fearless word of warning he utters, into every wise counsel, into every cheering look and smile, into every truthful, encouraging prediction. Confidence in himself,—confidence founded on early training and opportunities sought and improved, on unremitting study and careful observation and ripened experience,—naturally and legitimately begets confidence in the patient. The patient's mind is influenced, not only by the words and looks of the physician when he is personally present, but by the written or oral messages which he sends, and even by believing that at a certain agreed-upon moment he is cogitating on the case—quite as effectually, it is sad to say, when the doctor entirely forgets, as when he remembers, the engagement.

In some inexplicable manner the mental impressions thus made, and sensations originated, do affect, through the nervous system, the general or local circulation, so that in certain cases—chiefly nervous—mental therapeutics is not only appropriate, but it may be all-sufficient, while in nearly every case it is an aid—often a potent one—to a judicious and successful medical treatment.

In the hands of the plausible charlatan, in the hands of mercenary hypocrites, even in the hands of those good, credulous members of the fanatical fraternity or sisterhood—whether called Christian Scientists, or Faithists, or Mind Curists—who, utterly and even boastfully agnostic as to anatomy, physiology, and pathology, make guys of themselves by advising mince pie in gastric ulcer, vigorous exercise in the last stages of phthisis and cardiac dropsy, and by promising cures in locomotor ataxia, hob-nail liver, general

paresis, vesical calculus, uterine cancer, and all varieties and conditions of disease,—in the hands of audacious dabblers such as these—however unsuspected may be their brazen assumptions of sincerity, however able to inspire in their deluded victims an implicit but false confidence—mental therapeutics, by forbidding and preventing the use of requisite medication, and by imposing and continuing a senseless treatment in cases necessarily incurable, is always hazardous, and, directly or indirectly, the frequent guilty occasion of intense suffering, permanent injury, and fatal disaster, followed by inconsolable sorrow and remorse.

DISCUSSION.

Dr. H. O. Marcy, of Boston, said that while he was aware that such a paper could not be discussed, he desired to make a few remarks in connection with it. He wished to thank the author for the good work he had done in pricking the bubbles of popular belief. Although in a measure we all deride this subject of mental therapeutics, yet we meet it on every hand, and, to a certain extent, practise it ourselves. Although we see this ebb and flow of the public consciousness towards that which they blindly seek to compass and master, we do not offer to instruct them, and, discouraged and disappointed, the public come to feel that the medical profession is like a false reed, from which they cannot hope to obtain support. It is the first duty of the medical profession to attempt to teach the public in this direction. Certain work of this kind has been done, but usually by unprofessional men. We have felt that we did not know how to do it; but certainly we are better competent to treat this subject than the clergy, who are constantly attempting it, and who, of all men, are most ignorant of such matters.

Dr. George E. Fell, of Erie county, said that it was gratifying to note that at least in the public schools of this state an effort is made to give the children some sort of an idea about physiology. As an instance of the gross impositions constantly practised on the public by unscrupulous practitioners of medicine, he referred to a child in Buffalo who was running around the yard while under treatment for "pneumonia." The father was an intelligent and successful business man; yet his knowledge on medical topics was so limited that he allowed himself to be humbugged in this flagrant manner. In another case which he knew of, a child, with a very slight pharyngitis, was treated by a homoeopath for what he stated most emphatically to be a case of "very malignant diphtheria." A wider diffusion of medical knowledge would put an end to the perpetration of such frauds.

ADDRESS ON GYNAECOLOGY: SOME OF THE ACCIDENTS WHICH HAVE ATTENDED THE PROGRESS OF GYNAECOLOGY DURING THE PAST TEN YEARS.

By A. Palmer Dudley, M. D., of New York County.

October 30, 1891.

Mr. President and Gentlemen, Fellows of the New York State Medical Association: When asked by your committee to read a paper upon some gynaecological subject, at this the eighth annual meeting of our Association, it was with the utmost reluctance that I accepted the task, feeling that the honour could have been better bestowed upon some more experienced and worthy member, one who could entertain the society with fact, fancy, and anecdote, gleaned from a field of personal observation, and not, as I should be obliged to do, attempt to interest you with the old-fashioned, prosaic summing up of what other men had done to advance the science of our specialty during the past decade, and of which you are probably all well aware.

The saying has often been repeated, that in no branch of our profession has more advancement been made of late years than in that devoted to the treatment of diseases peculiar to women. It may also be truthfully said, About no branch has more been written. The enthusiastic statistical hunter has raked over the musty works of ancient times, and, were it possible, would have long since supplied a statistical average with which to bridge the Dark Ages and bring an unbroken chain of evidence from the ancient to the modern times, to show the steady advance in the science and art of gynaecology, and the gradually diminishing death-rate at the hands of him who is learned in that art. At the same time,

the conservative writer has been equally zealous in his efforts to show, by a long chain of evidence finely drawn out, that he who wields the knife in gynaecology is little short of a murderer. Each has worked his good, and each has found his level in the profession. It is not my purpose to tire you with a repetition of either side of the story, but to call your attention to some of the accidents that have attended the progress during the past ten years. It is only necessary for my purpose to go back so far.

At that time, displacements of the uterus were being treated with pessaries; the knowledge of peri-uterine diseases was very imperfect, and they were being treated mainly by local applications per vaginam; uterine fibromata had only occasionally received the mysterious influence of electricity; procidentia had not been relieved by utilising the normal supports of the uterus, from within the abdominal cavity; the primary laparotomy for extra-uterine pregnancy was not even in embryo; improvements in Caesarian work were dormant; and, in fact, intra-abdominal gynaecological surgery was yet in its infancy. During this time, intra-vaginal work has been but little improved. The master and teacher, Dr. Emmet, has brought the work to such a state of perfection that little is left to be done. Sims, our country's favourite, laid the foundation of modern gynaecology, and built well during his time, but, with all that emanated from his brilliant mind and also that of McDowell, another shining light in our profession while he lived, it remained for a foreigner to point out the pathway over which progress in the treatment of diseases of women would be made in the future. It is not every one that believes in prophecy; but time proves all things, and no truer prophecy was ever made than that by our honoured fellow, Dr. T. G. Thomas, in his address upon gynaecology at the first meeting of this Association, eight years ago, when he fearlessly predicted that an enlightened and conservative surgery would be the pivot around which would revolve the gynaecology of the future.

Let us see how this prediction has been fulfilled: what is

the evidence? Have the changes that have taken place in our methods of treatment been due to the discovery of a panacea, to be given t. i. d. in some palatable menstruum, accompanied by the usual directions for vaginal douches, etc., and for which the credit should be placed at the door of him who had laboured so earnestly, under the title of conservatism, to cover up his lack of mechanical ingenuity and ignorance of anatomical relations and surgical skill, while he belittled everything that tended towards advancement in the direction of a better knowledge of the pathological conditions within the pelvis which could not be ascertained by vaginal touch? or has it followed in the wake of him who fearlessly sought the seat of disease, which, if beyond the reach of his bimanual touch, was not beyond the reach of the knife? Upon which side of the question lies the bulk of evidence? Surely with the enlightened surgeon,—and, as a result, pessaries for displacements have given way to the various methods of fixation of the uterus by utilising its own supports; cellulitis is no longer the stumbling-block of the physician; electricity for extra-uterine pregnancy has been superseded by the primary laparotomy for its removal; and the long-continued vaginal applications for vague forms of disease behind and beside the uterus are now no longer the pinnacle of hope upon which the woman hangs her future prospects of health and happiness. By the aid of the knife in the hands of earnest and skilful men many of these doubts have been cleared, and a correct diagnosis of the different forms of intra-pelvic disease placed upon record, for the benefit of suffering humanity and to aid those who shall enter the profession in the future.

Let me ask, Has this great advance been secured without some loss? I think not;—but when the profit and loss to suffering humanity, as a result of work in gynaecology during the past ten years, shall have been properly and honestly summed up, it will readily be seen that the balance rests far on the side of profit; and the death-rate attending such work will (as it has in the past) continue to diminish as our ability

to make a correct diagnosis and our skill in operative manipulation shall increase with time and experience.

Thus far I have dwelt upon the two extremes, success and failure to cure by improved methods in surgery, and indulged a belief that failures were due largely to errors in diagnosis and unskilful surgery. I do not mean to say that all failures should be attributed to these sources alone, for accidents will many times attend the most careful work, and failure be the outcome of what would otherwise have been a complete success. It is to such results, following operation, that I particularly wish to call your attention, but the time allotted to this paper will only allow me to place upon record some experience with one form of accident.

For a number of years I have carefully watched the published records of cases of laparotomy, and occasionally I would find that, although an operation was recorded as a success, it would be noted that faecal fistula followed the operation. My experience with such cases leads me to believe that, could those patients have told their own stories, the successes would have been recorded as dismal failures, and many of them would have acknowledged themselves to be in a worse condition than before the operation was performed.

These accidents can be avoided if proper care is exercised, at the time of operation, in breaking up peri-uterine adhesions, and in freeing the diseased appendages for removal; and the accident is such a distressing one to the patient that every precaution should be taken to avoid its occurrence. I have had it occur twice in my practice, in one hundred consecutive laparotomies. A third case, and the last, came to me from another surgeon. It contained so much of interest, and, with my assistance, terminated so disastrously, that I determined to report it in full, and at the same time collect and report as many cases of a similar nature as possible. I acknowledge that I have succeeded far beyond my expectations. A thorough search of the medical journals reveals the fact that but very few cases have been reported where

secondary laparotomy for the cure of the fistula has been resorted to.

The following report of an unsuccessful effort to cure a faecal fistula, following laparotomy, by secondary operation after medication had failed, will serve as an introduction to this chapter of accidents which I desire to record.

Case. Mrs. E., aged 43, married 23 years, had never been pregnant. Her general health had been good, and menstrual history normal, except that her flow had been scanty rather than profuse. Her illness dated back two years and a half, and commenced with pain in the abdomen which came on suddenly and at irregular intervals, lasting sometimes only a minute, then relaxing and coming on again at intervals of from one to fifteen minutes. These attacks lasted twenty-four hours, more or less; then she would have immunity from pain for perhaps a week or month.

For two months previous to entering the California Woman's hospital (from whence this portion of the history was obtained) the pain had been exceedingly severe, and especially marked in the right inguinal region. After a paroxysm of such pain a loud gurgling sound could be heard. She had never, to her knowledge, had a discharge of pus from the rectum, but had passed blood in considerable quantity at stool. She had lost much in weight, and suffered from frequent chills, followed by elevation of temperature, occasionally reaching 103° F. The history of her case differed so materially from the general run of pelvic cases, and the difficulty of making a correct diagnosis by digital touch was so great, that exploratory laparotomy was decided upon, and, on May 13, 1890, Dr. McMonagle, surgeon-in-chief to the hospital, made the abdominal section. The uterus and its appendages were found to be in a normal condition; a large mass was found in the right inguinal region, which proved upon examination to be the appendix caeci and folds of caecum massed together by inflammatory exudation. The adhesions were with great difficulty separated, and inside the mass was found about a teaspoonful of pus. In breaking up the adhesions, a hole was made in the intestine which was closed with catgut. The opening in the caecum, which was caused by the removal of the appendix, was also closed with catgut, and the abdominal cavity washed out with boiled water and closed with silk. She made an uninterrupted recovery from this operation; the abdominal wound healed by first intention, but one month later an inflamed condition of the wound was noticed, and she complained of great pain in that region. An incision was made in the line of the former one, and considerable pus and faecal matter escaped. This wound was washed out three times daily, and packed with iodoform gauze for a period of two months. It closed to a very great extent, but continued

from time to time during the following year to discharge faecal matter. The patient had in the meantime grown fleshy, and enjoyed considerable comfort.

All methods of treatment by irrigation and medication had failed to insure closure of the fistula. She came East, and placed herself under my care in February last. At that time the fistula was discharging freely of faecal matter, in fact, almost the entire contents of the bowel were discharged through the fistula, the external opening of the latter being at the upper angle of the scar just beneath the naval. A probe entering the fistula passed three and a half inches into the abdominal cavity, and took a direction towards the lower portion of the caecum. Having such a history before me as I have just read, I laboured under the impression that the stump of the amputated appendix having been sewed up with catgut, the latter had become absorbed before good union had taken place, and the fistula had made its way from that point. The history contained no evidence that would lead to any other conclusion. All efforts to close it by medication having failed, when appealed to for relief by another operation, I readily consented to try. Two good consultants, Drs. Lee and Hanks, kindly saw the case with me, and coincided with my opinion.

On March 11, 1891, I attempted the work, assisted by Drs. Goffe and Offenbach. An incision was made by the side of the old scar; the intestines were found to be somewhat adherent to the peritonaeum; the track to the intestinal opening was about the size of one's little finger, and formed by the abdominal peritonaeum on one side and by the mesentery on the other. Great difficulty was experienced in bringing the caecum into view, owing to the thickness of the abdominal walls and adhesions about the intestines in the neighbourhood of the fistula. After much difficulty the intestine was exposed, and it was found that, instead of a fistula existing where the appendix had been amputated, the appendix was still intact and normal in size; but up the anterior side of the caecum, at its junction with the ilium, there were five openings, each as large as a lead pencil, and all discharging into the one canal that opened through the skin. It at once became evident that a mistake in diagnosis had been made at the first operation.

The fistulae were in close relation to each other, all within the diameter of an inch and a half, and two of them opening directly into the ilio-caecal valve. You can readily see that the location of these fistulae was a most disadvantageous one. The infiltration and inflammatory exudation about the parts had thickened the coats of both the large and small intestines to such an extent that the calibre of the canal was much diminished, but to just what extent I could not tell at the time. Beyond the parts involved, both the small and large intestines had become much dilated and thinned.

I acknowledge I was in a quandary as to what I should do, or how I should handle the case. The mesentery, as you will see in the specimen which I have, was an inch thick with fat, making the operation of exsection a most difficult and dangerous one. Setting aside the fact that to exsect and unite the small intestine to the caecum with any prospect of securing perfect union would have been next to impossible, I abandoned the idea. The effort was then made to bring the small and large intestine together and make anastomosis above the fistulae, at the same time covering the latter in by uniting broad surfaces of the intestines. This method was found to be impracticable, as it would allow of pocketing of faecal matter in the dependent portion of the caecum. As a last resort, I determined to close each opening with fine silk, and then cover the openings with the peritonaeum of the mesentery. This was done, and at the time looked sufficiently strong to hold until union had taken place. The only drawback to this method of treating the case was the small calibre of the canal through which the faecal contents must make their way. The fistulous track was removed, and the peritonaeum brought together.

The patient rallied well, and appeared to progress favourably till thirty-four hours after the operation. During this time small doses of saline cathartics had been given to keep the contents of the bowel in a liquid state. Thirty-five hours after the operation the bowels moved well, with much relief to the patient. Two hours later a second movement occurred : with it the patient experienced a sharp pain in the right inguinal region, and cried out that something had given way. She suffered a profound shock, and sank rapidly, dying in two hours. I felt sure that some accident had occurred with the second stool, and one half hour after death I re-opened the abdominal cavity, and found my suspicions confirmed : the larger of the five openings had given way, and the contents of the bowel had escaped into the general peritonaeal cavity. I removed the diseased portion of intestine, and the pathological condition which it presents is certainly an interesting one. It will be seen that the disease was not within the appendix but far above it, and in such a locality that any form of surgical relief was most difficult to obtain. In fact, I should not have attempted the operation, and I presume this remark can be borne out by the experience of many of those present ; but my experience with such cases, coupled with the misleading history which I had received of the first operation, put me in a position to be unprepared to find such a condition and unequal to the emergency. However, the performance of laparotomy upon woman for intra-abdominal and pelvic disease has now become such an ordinary, every-day surgical procedure, that the writer who cannot periodically report his series of successful cases frequently feels it incumbent upon himself to apologise for his lack of experience. But the mere report of a successful result, meaning that the patient did not die, does not tell the tale of many of them, or half the woes which

the patient would have escaped had she not been the heroine in the drama. Human nature, after all, is frail, and it is not every man that wants to publish his failures to the world, and the misery that sometimes follows his handiwork within the peritonaeum is never known; but many times I feel that more is learned in our profession from the careful analysis and publication of cases in which we fail, than by a long series of successes.

At the meeting of the American Gynaecological Society in Boston three years ago, Dr. Coe read a valuable paper upon accidents following laparotomy. One of my objects at the present time will be to add another to the list, record some personal experience with the accident, and place before this Society, for consideration, a series of cases that I have gleaned from the practice of other men engaged in abdominal surgery. That a faecal fistula, following laparotomy, is by no means an infrequent accident, will be shown by the number of cases I have collected in a short period of time. I am well aware that the history of many of them will be imperfect in detail, but by a careful consideration of each, I hope to be able to point out some of the causes of the accident. That the accident (for such I shall term it), when it does occur, is a serious one, no one can dispute, and if the history of these cases points to the fact that fistulae followed most frequently in those cases where there were extensive adhesions, then the old saying that "an ounce of prevention is worth a pound of cure" is one well worth remembering while working within the abdominal cavity.

Some Methods of Prevention.—In cases of disease of the appendages, complicated by extensive adhesions, I consider it unwise for any operator to work against time, or calmly attempt to show an attentive audience how rapidly he can complete such an operation. I think many times the mistake is made of attempting to work in the pelvis through too small an abdominal incision. If we have a case complicated by extensive adhesions, we should without delay make an incision sufficiently large to readily admit of visual inspection of the pelvic contents. We are then able to locate the adhesions readily, and many times escape the dangers of

injury to the intestines, which by blind manipulation with our fingers we could not prevent. Frequently in our experience we meet with cases where the adhesions are so strong that they cannot be broken up or released except by the aid of instruments. Under such circumstances it becomes an easy matter to do injury to the peritonaeal covering of the gut while carelessly dragging upon adhesions attached to it, and have the injury escape notice until it makes itself manifest by leakage and a fistula, which in the majority of these cases (forty-one of the seventy-four) it did in about one week after the operation.

When closing the abdominal cavity, if drainage must be used, the greatest care should be taken to employ that form which will answer the purpose with the least inconvenience or injury to the patient. From my own personal experience I am satisfied that the use of iodoform or bichloride gauze as a means of drainage from within the abdominal cavity serves a better purpose, and is less dangerous than the glass tube, owing to the fact that the latter, if subjected to pressure from above, is liable to produce sloughing of the bowel if resting against it within the pelvis.

It would appear from the records of the cases I have collected, that in the vast majority (sixty out of seventy-four) the prime cause of the accident was extensive adhesions in the pelvis, in the breaking up of which some injury was done to the coats of the intestines, and the injury had been overlooked at the time of the operation. It is a well known fact, that injury to the intestine, unless very extensive, if properly repaired at once, will usually heal without a resulting fistula. I am well aware that some of the older operators yet adhere to the idea that it is best to work in the pelvis through as small an incision as possible, and with the utmost speed—deeming both to be great factors in preventing shock to the patient. My own experience has taught me the contrary, while it has demonstrated to my satisfaction how easy it is to injure the coats of the intestines in blindly breaking up firm adhesions within the pelvis.

Name of Operator.	No. of case.	Time of appearance.	Portion of intestine involved.	Form of disease operated for.	Influence of drainage-tube in its cause.	Character of adhesions encountered.	Success or failure to cure by medical treatment.	Was secondary laparotomy made?	Remarks.
Dr. Ashby, Baltimore.	2	1st, 6th day. 2d, 14th day.	Sigmoid flexure of colon.	1st, pustules; 2d, ruptured tubal pregnancy.	Tube used in both cases; but had no influence.	Extensive intestinal adhesions about the appendages.	Both closed spontaneously—1st in 3 weeks, 2d in 9 weeks.	No.	Both made a most satisfactory recovery.
Dr. Baer, Philadelphia.	3	1st, 10th day. 2d, 2d day. 3d, 15th day.	Sigmoid flexure of colon.	2, large ovarian cysts; 1, pyosalpinx.	Exciting cause in two cases.	Extensive in the 2 cases when tube was used.	Two closed spontaneously.	Yes; in 2 cases fistula not found.	Will not attempt secondary laparotomy again; the best treatment I consider non-surgical.
Dr. Bernays, St. Louis.	5	1, 1st week. 2, 2d week. 1, 3d week. 1, 5th week.	Ilium in three cases; sigmoid flexure in two cases.	Pyosalpinx in four cases.	Cannot answer; cases operated upon by other surgeons.	Extensive in all the cases.	No success with medical treatment.	Yes; in 2 cases.	Three still under observation when reported.
Dr. Byford, Chicago.	1	3d day.	Sigmoid flexure of colon.	Ovarian tumor.	None used; gauze drainage.	Ureter was sectioned, and stitched into wound.	None.	No.	Patient died at end of week from exhaustion.
Dr. Boldt, New York.	1	3d week.	Ilium.	Ovarian tumor.	No tube used.	Adhesions moderate.	None.	Yes.	Result: a cure. Cause of fistula—mural abscess, rupturing into bowel.

Dr. Bellamy, Memphis, Tenn.	1	2d week.	Ilium.	Broad ligament cyst.	Tube used; cannot state what its influence was.	Adhesions all about the tumor, but not intestinal.	No success with medical treatment.	No.	Cyst could not be enucleated, and was drained without being stitched to the wound.
Dr. Coe, New York.	3 Not his own.	1st, 2d, and 3d week.	Small intestine.	2, ovarian cyst; 1, pyosalpinx.	Caused in two cases by tube pressure.	Adhesions in cul de sac.	No success by medical treatment.	No.	Witnessed one case of secondary laparotomy which terminated fatally.
Dr. Currier, New York.	1	One month after second laparotomy.	Ilium.	Papilloma of both ovaries.	Mural abscess, in track of tube.	Adhesions extensive.	Closed in 3 weeks spontaneously.	No.	This fistula was subsequently opened by accident.
Dr. Cushing, Boston.	5	All during 1st week.	Not stated.	2, tubercular peritonitis; 3, disease of appendages.	No influence attributed to d. tube.	Adhesions extensive.	Three healed kindly.	No.	All of these cases were severe ones.
Dr. Dudley, Chicago.	1	During 1st week.	Not known.	Ovarian tumor.	Tube used; influence unknown.	Extensive adhesions.	Failure to secure closure.	No.	Patient died several months after from Bright's disease.
Dr. Dudley, New York.	3	1st, 20 days. 2d, 60 days. 3d, 30 days.	1st, sigmoid flexion; 2d and 3d, through caecum.	1st 2, pyosalpinx; 3d, pericaecal disease.	No tube used.	Extensive adhesions in all.	1st 2, closed kindly; 3d, failed.	Yes; in 3d case.	Patient died 39 hours after operation, from re-opening of intestine. See case reported.

Name of Operator.	No. of case.	Time of appearance.	Portion of intestine involved.	Form of disease operated for.	Influence of drainage-tube in its cause.	Character of adhesions encountered.	Success or failure to cure by medical treatment.	Was secondary laparotomy made?	Remarks.
Dr. Etheridge, Chicago.	2	Both in 1st week.	Small intestine.	Removal of tubes and ovaries.	Tube used in both; thought to be injurious.	No adhesions.	No success by treatment.	Both refused operation.	Both died; time of death not stated.
Dr. Goodell, Philadelphia.	5	All in 1st week.	All through the rectum.	2, pyosalpinx 2, parovarian cysts.	Tube was influential in causing all.	Extensive adhesions in all.	Three healed kindly; the fourth still open at end of a year.	No.	Am disposed to attribute the formation of the fistula to the pressure of the drainage-tube.
Dr. Goffe, New York.	1 Not his own.	Six weeks.	Not known.	Ovarian tumor.	Tube used; influence not known.	Extensive adhesions.	Medical treatment unsuccessful.	No.	Patient died of peritonitis.
Dr. Gordon, Portland, Me.	1	3d month.	Unknown.	For removal of appendages.	No tube used.	Adhesions extensive.	Medical treatment successful.	No.	The cautery was used in treating this case.
Dr. Jackson, Chicago.	1	Ten days.	Small intestine.	Ovarian tumor.	Tube used; but had no influence.	Adhesions extensive.	Medical treatment failed.	Yes.	Secondary laparotomy was made by another operation; patient died in 24 hours.

Dr. Jaggaiel, Chicago.	1	Seven days.	Small intestine.	Hernia of umbilical cord in child.	No influence from tube.	No adhesions.	Medical treatment successful in 2 weeks.	No.	Fistula caused by pressure of hare-lip pins used in closing wound.
Dr. Johnson, Washington.	2	1st, 10 days. 2d, 2 weeks.	Could not say.	Pelvic peritonitis.	Tube used and directly influential.	Yes, in 1st; No, in 2d.	Both healed kindly.	No.	
Dr. Kelly, Baltimore.	12	All in first week.	Sigmoid flexure.	Pyosalpinx and ovarian abscess.	Tube used but had no influence.	Extensive adhesions in all the cases.	All but one healed kindly.	No.	In these cases the fistula was caused by injury to the outer coats of the bowels.
Dr. Lee, New York.	3	2, 1st week. 1, 10 days.	2, through rectum. 1, through descending colon.	For extensive disease of appendages.	Tube cause in 2; not used in 3d.	Extensive adhesions in all.	All healed kindly by medical treatment.	No.	Constant irrigation was used in these cases with the best of success.
Dr. T. H. Manley, New York.	3	One month to four.	Not known positively.		Cannot say as to influence of tube.	Extensive adhesions in 2 cases.	One healed kindly; others not known.	No.	
Dr. McLaren, St. Paul.	2	Seven and ten days.	Small intestine; Sigmoid flexure.	Pyosalpinx and Tait's operation.	Direct influence in one case.	No adhesions.	None.	In first, twice, without success.	Second case operated upon since report was sent; result not known to me.

Name of Operator.	No. of case.	Time of appearance.	Portion of intestine involved.	Form of disease operated for.	Influence of drainage-tube in its cause.	Character of adhesions encountered.	Success or failure to cure by medical treatment.	Was secondary laparotomy made?	Remarks.
Dr. Mann, Buffalo.	1	3 weeks.	Large intestine.	For intestinal anastamosis.	Tube had no influence.	No adhesions.	Closed spontaneously.	No.	
Dr. Moseley, Baltimore.	1	10 days.	Small intestine.	Double pyosalpinx.	Cannot say.	Extensive adhesions.	Closed spontaneously.	No.	
Dr. Palmer, Cincinnati.	1	2d week.	Small intestine.	Ovarian tumor.	No tube used.	Extensive adhesions.	Closed spontaneously.	No.	
Dr. Parish, Philadelphia.	2	3 and 6 weeks.	Sigmoid flexure and rectum.	Haematosis and double tubal abscess.	Soft tube used; no influence.	Extensive adhesions in both cases.	1st, closed by medical treatment; 2d, failed after making vaginal communication.	No.	The second case was caused by patient's walking about on 3d day with drainage-tube in position.
Dr. Reamey, Cincinnati.	4	6 weeks. 5 weeks. 2 weeks. 2 weeks.	2, through ilium; 1, rectum; 1, hepatic flexure of colon.	2, tubercular peritonitis; 1, ectopic gestation; 1, removal of right kidney.	Tube instrumental in all the cases.	Extensive adhesions in all.	1st and 2d died; 3d healed spontaneously; 4th, never healed.	No.	Third case ectopic gestation reported in Cincinnati Academy of Medicine.

Dr. Reeves, Dayton, O.	1	1st week.	Cannot say.	General peritonitis.	Tube had but little influence.	Extensive adhesions.	No results.	No.	
Dr. Sims, New York.	2	1st week.	Both through small intestine.	Fibroid tumor and ovarian cyst.	Tube used in 1st; no influence.	Adhesions extensive.	Healed spontaneously.	No.	First case, recovered perfectly. Second, died from facial erysipelas.
Dr. Sutton, Pittsburgh.	1	2d week.	Small intestine.	Tubercular peritonitis.	No tube used.	Adhesions extensive.	Healed spontaneously.	No.	
Dr. Thomas, New York.	2	1st, 1st week. 2d, unknown.	1st, through small intestine. 2d, unknown.	Double ovariotomy.	Tube used; influence not known.	Adhesions very extensive.	Both cases healed spontaneously.	No.	Second case reported by Dr. Sutton of Pittsburgh.
Dr. Wilson, Baltimore.	1	1st week.	Small intestine.	Ovarian tumor.	Tube instrumental in causing fistula.	Adhesions very extensive.	Fistula never healed.	No.	Dr. Wilson holds the opinion that the tube is largely instrumental in causing faecal fistula.

NOTE. A glance at this table will show that by far the greatest number of successes were secured by medical treatment; also that the results obtained by secondary laparotomy were certainly not encouraging. In the seventy-four cases, eight secondary operations were made,—three being successful, three proving a failure (the fistula not being found), and two resulting in death.

Following direct injury, I consider the next most frequent cause of fistula to be the indiscreet or improper use of the drainage-tube, for I claim that many times it is used when there is not the slightest indication for it. I cannot claim it as the cause in my own cases, for I have only used the drainage-tube twice in my laparotomy work, and in both the patient died before faecal fistula could develop. Of the seventy-four cases reported, in only thirteen was the drainage-tube not used, and in twenty-six of the cases the accident was attributed directly to the use of the tube by the operators, while no answer was given to the question in thirty of the cases. In only eighteen was the claim made that the tube did not influence the formation of the fistula.

A third cause which I deem an element of danger, to be well considered and guarded against, is the use of catgut suture in intestinal surgery. I have long since learned better than to trust an injury of the intestine to catgut suture, and believe that we should never use the latter in such work. To insure perfect coaptation of the coats of the intestine until perfect union had been secured, would require the use of catgut much too large to be used in such tissue, while the influences peculiar to the intestines themselves, acting upon catgut, in my judgment makes it a very unsafe form of suture for such work.

Of the various forms of pelvic disease for which laparotomy was resorted to, and in which fistulae afterwards developed, diseases for which Tait's operation was performed head the list, numbering thirty-three of the seventy-four, while tubercular peritonitis and parovarian cyst occupy second and third place in point of frequency of occurrence.

One of the most difficult questions to answer, by those who so kindly favoured me with reports of their cases, was the one relative to the exact location of the fistula through the bowel. A positive answer could not be vouchsafed for twenty of the cases: in thirty it was thought to be the sigmoid flexure of the colon or rectum, in seventeen through the small intestine, two through the ascending and one through

the descending colon. It is to be regretted that so little positive information could be obtained concerning this point, for upon our ability to correctly locate the seat of injury to the gut must largely depend our methods of treatment for its relief and our prognosis of future immunity from trouble.

Methods of Treatment.—The hardest part of my task approaches, when I attempt to formulate any concise method of treatment, either medical or surgical, for the cure of faecal fistulae following abdominal section. I have already expressed the opinion that for this form of accident the treatment should be eminently a preventive one, and, unless the case be one of pyosalpinx, or some sort of suppurating disease within the pelvis, in which the injury to the bowel has already taken place, in ninety-nine cases out of a hundred this accident can be prevented by exercising the care and attention to detail, when making the primary laparotomy, which I have drawn attention to. My chief object in choosing this subject for my paper was the hope that in collecting cases I should be able to gather from the combined methods of treatment adopted in the cases reported, some form of treatment which, if properly carried out, would secure a good result in all cases. But when I find that only thirty-nine of the seventy-four cases reported yielded to any form of medical treatment, and that in those cases which resulted in cure the operator did not report the successful method employed, I am thrown upon my own resources and my own experience for the methods of treatment which I shall recommend for such accidents.

I believe that in the majority of cases, if proper medical treatment is at once instituted, a closure of the fistula will be secured; but, as I have already stated, the result will depend largely upon the location of the fistula, and in those cases where success has been attained by methods non-surgical, the injury to the intestine has occurred low in the pelvis, where there is slight vermicular action of the bowel.

Absolute rest in bed is an essential feature of the treatment and the patient kept upon a diet that is as little gas-

producing as possible, the purpose of this being to prevent distention of the bowel and allow the borders of the rent to lie as much in apposition as possible. The object to be attained in securing success is a firm closure of the fistula from its starting-point in the bowel, and when it has manifested itself no time should be lost in stimulating granulations about the site of the injury. In the two cases which occurred in my practice, one started in the sigmoid flexure of the colon twenty days after laparotomy was made, and the other made its way through the caecum two months after the operation. As soon as I was informed that leakage had taken place, I located the direction of the sinus, and after washing it out thoroughly with a bichloride solution (1 to 1,000) I carried through the sinus and directly into the bowel a tampon of marine lint saturated with balsam Peru. This dressing should be repeated daily, and the tent kept in the bowel until the opening has become quite small; then the bowel should be thoroughly cleaned out with some form of cathartic, and afterwards kept at rest for a week or until the resulting granulations have closed the opening in the bowel, which would be evidenced by the cessation of the escape of gases through the sinus; when first moved again it should be by enema. Even after closure of the fistulous opening in the bowel has been secured, the sinus ought to be kept packed with the marine lint until granulation gradually forces it out and closes the sinus. In both of my cases this method of treatment was successful: I cannot say that it would have been had the fistula been in the small intestine, but I see no reason why it should not.

To be sure, the method I have spoken of is not the only one that has been successfully adopted. Medical treatment of this condition must necessarily be with remedies which will stimulate a closure of the track by granulations, but the secret of success is the proper managment of the bowel as a whole,—to keep it well emptied, free from gas, and, above all, well irrigated. In a case that occurred in the service of Dr. Lee at the Woman's Hospital, Dr. Bird, the house-surgeon at

that time, succeeded in closing a large faecal fistula, after other methods had failed, by keeping the parts irrigated by a constant double current of warm water.

Should all attempts to close the fistula by such methods as I have mentioned fail, then the question of treating it by surgical means arises. Here, again, the method of treatment to be adopted will depend entirely upon the location of the fistula and the pathological conditions which surround it. A radical closure of the rent in the bowel means another laparotomy upon the patient with all the attending dangers; and still there are many cases that have been neglected in the early stages of their formation, and have resisted all forms of medical treatment afterwards, that would readily and kindly yield to treatment by suture if the surgeon have the courage to try the second time, and the patient would consent to undergo the ordeal. It is a much easier task to close fistula of the small intestine than of the large, owing to the difference in the thickness of the coats of the former, and the fact that when the fistula occurs in the large intestine it is usually so low in the pelvis as to make it very difficult to insert suture, owing to the inability to get a good view of the parts. However, this difficulty can be readily overcome by illuminating the pelvic cavity with reflected light, and placing the patient in the Trendelenberg position, with the hips elevated so that the abdominal contents shall gravitate away from the parts we wish to work upon.

Some two years ago I reported a case of secondary laparotomy for the purpose of finding a suppurating ligature and closing the sinus. After entering the abdominal cavity, I found that the sinus not only led outwards through the skin, but also into the rectum through its upper portion. In this case the opening in the bowel was so low in the pelvis, and the adhesions about it so firm, that I could not bring it into view, but, by illuminating the pelvic cavity with reflected light, I was able to locate the fistula and close it successfully by stitching the rectum to the posterior wall of the uterus.

Although I am a strong advocate of the use of catgut

within the abdominal cavity whenever it can be done, in all cases of intestinal surgery I should abstain from using it, and employ in its stead fine silk that had been properly prepared for the purpose. I invariably use the continuous stitch in this work in preference to the interrupted, for I deem it a safer form to employ.

If the fistula has occurred in the small intestine, and is of such magnitude that it cannot be closed by freshening the edges and properly uniting the cut surfaces, then the question of exsection of the bowel arises. It is being successfully done, and had it been possible, I should have performed that operation in the case I have reported. Had I to deal with such a case again, I would treat it very differently, and, even though I sacrificed the ilio-caecal valve, I would cut the stricture and attempt a union of the intestine after the manner in use for the relief of pyloric stricture.

It is not my purpose to enter into a discussion in this paper of the different forms of treatment adapted to injury of the intestines, but to record the fact that certain accidents have followed in the wake of improvement in gynaecology, and to attribute those accidents largely to carelessness. Although I have been looked upon as one who might be deemed radical in my ideas respecting abdominal surgery, I most emphatically declare that conservatism is always my motto, but I do not interpret conservatism to be idly sitting by and using palliative methods of treatment for cases which I do not understand, at the same time reading of work performed by others and condemning it because I cannot do it myself; but, rather, I consider conservatism to mean faithful, careful, intelligent study of one's cases, until we can make a diagnosis based upon a perfect knowledge of the pathological conditions existing in each of the patients studied, and in that way know from positive knowledge whether operative interference is demanded or not; when that point has been determined, then operate, with the object in view always of having our patient recover without being obliged to record such an accident as I have narrated.

OPTIC NEURITIS AS A FORM OF PERIPHERAL NEURITIS.

By Alvin A. Hubbell, M. D., of Erie County.

October 30, 1891.

Peripheral neuritis, both clinically and pathologically, has assumed a recognised position in medicine to-day. The attention of physicians in the past has frequently been directed to manifold sensory, motor, and trophic affections, but until recently the conjectured lesion has been located in the spinal cord or brain, or the disease has been regarded as merely functional. It was in 1866 that Duménil[1] established by autopsy and microscopical examination the existence of extensive disease in the peripheral nerves as the cause of such manifestations, although Graves, of Dublin, had, nearly twenty years before, expressed his belief that the spinal cord or brain was not the seat of such lesions. Ten years after Duménil made the first demonstration, Eichorst[2] recorded a case in which a post-mortem examination showed the spinal cord to be perfectly sound, but several peripheral nerves presented evidences, both grossly and microscopically, of interstitial inflammation. Then followed Joffroy,[3] in 1879, Leyden,[4] in 1880, and Grainger Stewart,[5] in 1881, with similar reports. During the past decade the pathological study of peripheral nerves has been pursued with commendable zeal, and upon inflammation of them or its results is now known to depend many forms of paralysis, especially localised ones, numerous sensory disturbances, and various trophic changes

[1] Gazette Hebdom. de Med. et de Chirurg., 1866.
[2] Virchow's Arch., lxix, 1876.
[3] Arch. de Phys. Norm. et Path., 1879.
[4] Zeitschr. für Klin. Med., 1880.
[5] Edinburgh Medical Journal, 1881.

in the skin, bones, muscles, and other tissues whose description in detail I must withhold from this paper.

Investigators have also shown that such inflammations and degenerations follow upon certain diseases or certain agencies with a frequency that justifies the regarding of the latter as aetiological factors in the production of the former. Among those which thus act as causes, may be mentioned diphtheria, scarlet-fever, measles, small-pox, typhus, typhoid and malarial fevers, la grippe, syphilis, tuberculosis, leprosy, diabetes, rheumatism, locomotor ataxia, beri-beri, etc., and such substances as lead, arsenic, alcohol, bisulphid of carbon, etc. There is also idiopathic peripheral neuritis whose cause is not apparent, which expresses itself in such diseases as herpes zoster, Reynaud's disease, circumscribed scleroderma (Hutchinson), sciatica, so called rheumatic paralysis, such as that of the facial, abducens, etc. Again, it may occur from traumatism and pressure.

The relation which peripheral neuritis is thus shown to hold to other diseases, both as an effect and as a cause, gives it a far reaching importance to the diagnostician, therapeutist, and pathologist.

I desire at this time not only to emphasise this importance, but to indicate, also, that this disease is not confined to the nerves of motion and general sensation as is usually understood by the profession, but includes inflammations of nerves of special sense as well, having the same known general causes, as well as arising idiopathically or from unknown causes, and the symptoms of which correspond in character and magnitude with the functions involved.

I might with propriety consider inflammations of the olfactory and gustatory nerves, and point out how they may be the sequence of influences not started or found in their end-organs or in the brain, but arising from the same causes as inflammations of other nerves. It is only thus that many affections of smell and taste can be accounted for. So, also, with the nerve of hearing. Certain forms of deafness, tinnitus, and vertigo are undoubtedly induced by typhus and

typhoid fevers, measles, scarlet-fever, small-pox, mumps, and syphilis through a peripheral neuritis of the auditory nerve. I will, however, limit this part of my discussion to inflammations of the optic nerve.

The pathology and pathological anatomy underlying many forms of visual disturbances are subjects of comparatively recent study. Before the discovery of the ophthalmoscope, the fundus of the eye was clinically an impenetrable region. With this instrument the practitioner has been enabled to reach and study it, and by post-mortem examination has verified the diagnosis of such forms of neuritis as express themselves at the intra-ocular extremity of the optic nerve—the optic disc—by swelling, cloudiness, and change of colour. But there are some cases which present the subjective symptoms and clinical history of optic neuritis, the ophthalmoscope not showing the disc-picture formerly believed to be a necessary accompaniment. As early, however, as 1866, Von Graefe,[1] of Berlin, whose clear insight and acuteness of observation have never been excelled, suspected that such subjective symptoms were not due to amaurosis (amaurosis was then as now a cloak-word for pathological ignorance) or to brain disease, but rather to inflammation of the optic nerve situated behind the ball and showing very little change within the eye, and therefore out of sight of the ophthalmoscopist. He described cases in which vision became clouded, and within a few hours or days absolute blindness ensued, and yet the ophthalmoscopic signs were almost negative. Both eyes were symmetrically affected, and the blindness was temporary in some and permanent in others. To this form of disease, acute in character, he gave the name retro-bulbar or retro-ocular optic neuritis. The diagnosis of the lesion was afterwards verified by post-mortem examinations. Later, Leber,[2] in 1869, expressed the belief that the symptoms in certain cases of amblyopia, with central scotoma, but without any marked changes in the fundus of the eye, were due to a form of chronic inflammation in the orbital portion

[1] Arch. f. Ophthal. xii, 1866, p. 114.
[2] Archiv. für Ophthal., xv, 1869, p. 65.

of the optic nerve. These conjectures were subsequently entertained by other investigators, but it was not till Samelsohn,[1] of Cologne, in 1880, and Nettleship and Edmunds,[2] of London, in 1881, made the initial post-mortem examinations of cases of central amblyopia that demonstration was actually made of an inflammatory and resulting degenerative process in the course of the optic nerve. In each of these cases there was found "a tract of chronic interstitial inflammation and degeneration extending from the optic foramen, where it was central, to the eye-ball, where it occupied the outer part of the optic nerve."[3] Similar results were obtained by Vossius,[4] of Konigsberg, in 1882, Bunge,[5] of Halle, in 1884, Uhthoff,[6] of Berlin, who made seven autopsies in 1884 to 1886, and Sachs,[7] of Innsbruck, in 1887.

Thus it has been conclusively proven that optic neuritis may exist both with and without objective ophthalmoscopic signs, and with varying subjective symptoms from mild to aggravated, and in its progress it may be rapid or slow. These symptoms, objective or subjective, I need not detail here. They are clearly before the profession.

In diagnosis, however, proper exclusions should be made in cases where impairment of vision cannot be readily accounted for by the ophthalmoscope or other means of examination. Thus there are various lesions within the encephalon that affect vision without involving the optic nerve,—for example, disease of the occipital lobe of the brain. Quinine produces in sufficient doses such disturbance of the circulation of blood in the optic nerve by vasomotor irritation as greatly to contract the field and diminish the acute-

[1] Centralbl. f. d. Med. Wissenchaften, Berlin, xviii, 1880, p. 418; also, Archiv. f. Ophthal., xxviii, 1882, p. 1.

[2] Trans. Ophthal. Soc. United Kingdom, 1, 1881, p. 124.

[3] Nettleship, Trans. Ophthal. Soc. United Kingdom, 1, 1881, p. 128.

[4] Archiv. für Ophthal., xxviii, 1882, p. 201.

[5] Uber Gesichtsfeld, etc. (Field of Vision and Course of the Fibres in the Optical Conducting Apparatus.) Halle, 1884.

[6] Centralbl. für Prakt. Augenheilk., 1884, p. 43, and Archiv. für Ophthal., xxxii, 1888, p. 95, and xxxiii, 1887, p. 257.

[7] Archiv. für Augenheilk., xviii, 1887, p. 21 (translated in Arch. of Ophthalmology, 1889, p. 133).

ness of vision, either temporarily or permanently. Experimental research by De Schweinitz,[1] of Philadelphia, made during the present year, on animals, goes to show that it does not produce neuritis. Atrophy of the optic nerve may undoubtedly take place, without a preceding neuritis, by some mechanical or vasomotor arrest or diminution of blood-supply to the nerve.

As causes of optic-nerve inflammation, there are many that are common to this and other forms of neuritis. Thus, it may be caused by injury, and injury will produce neuritis elsewhere. Contiguous inflammations, such as orbital cellulitis or meningitis, may cause it. So may other nerves become involved in the inflammatory processes of surrounding tissues. Pressure from growths or foreign bodies causes inflammation of both the optic and other nerves.

It is well proven and generally admitted, that certain substances and poisons produce an inflammation of certain peripheral nerves (peripheral neuritis), prominent among which are alcohol, lead, arsenic, and bisulphid of carbon. These substances, too, produce some form of optic neuritis. To fortify this statement I will cite some authorities. Uhthoff,[2] of Berlin, has clearly shown that alcohol develops axial or chronic retro-bulbar, optic neuritis. Hutchinson,[3] of London, and Allbutt,[4] of Leeds, are among several who have reported cases of optic neuritis and subsequent optic-nerve atrophy, as shown by the ophthalmoscope, caused by lead within the system. Among those who have seen optic neuritis in chronic arsenic poisoning are Da Costa,[5] of Philadelphia, and C. L. Dana,[6] of New York. Nettleship,[7] of London, Fuchs,[8] of Liege, Galezowski,[9] of Paris, and others, have seen "axial" optic neuritis (central amblyopia) in persons exposed to the

[1] Ophthalmic Review, London, x, 1891, p. 49.
[2] Archiv. für Ophthal., xxxii, 1886, p. 95, and xxxiii, 1887, p. 257.
[3] Royal London Oph. Hospital Reports, Part I, vol. vii, 1871, p. 6.
[4] Use of the Ophthalmoscope, London, 1871, p. 265.
[5] Medical Times, Philadelphia, March, 1881.
[6] Brain, London, ix, 1886, p. 546.
[7] Trans. Oph. Soc. Un. Kingdom, v, 1885, p. 149.
[8] Trans. Oph. Soc. Un. Kingdom, v, 1885, p. 152.
[9] Rec. d' Ophthal., 1887, p. 30.

fumes of bisulphid of carbon, in the manufacture of certain rubber materials.

Diseases which cause peripheral neuritis also cause optic neuritis. Hulke,[1] of London, as early as 1868, recorded cases of optic neuritis after diphtheria, and Allbutt[2] and others have made similar observations. Wadsworth,[3] of Boston, and others have seen optic neuritis after measles. Macnamara,[4] of London, has reported cases in which optic neuritis developed in rheumatism and intermittent fever. He has also seen this disease in la grippe,[5] and so also has Weeks,[6] of New York, and others. The history of the recent epidemics of la grippe furnishes many examples of "peripheral palsies."

Typhoid and typhus fevers, small-pox, scarlet-fever, syphilis, tabes, tuberculosis, and diabetes stand out more or less prominently in their aetiological relations to peripheral neuritis. Optic neuritis also is found in each of them in corresponding frequency.

Lastly, both peripheral and optic neuritis occur alike idiopathically without any assignable cause.

I might multiply illustrations showing the common origin of both so called peripheral neuritis and optic neuritis in some of their varieties, but it seems to me that the evidence already adduced is sufficient to place beyond doubt the claim that certain aetiological influences and pathological results are common to both, the symptoms varying only in correspondence to difference of function of the nerve or nerves affected.

We cannot, perhaps, understand why alcohol, bisulphid of carbon, tobacco, or diabetes should induce axial or chronic retro-bulbar neuritis, while lead, arsenic, diphtheria, tabes, la grippe, or measles should develop a neuritis more generally interstitial, often acute, and showing ophthalmoscopic signs.

[1] Royal London, Ophthal. Hos. Rep., vi, p. 108.
[2] Use of the Ophthalmoscope, 1871.
[3] Trans. Am. Ophthal. Soc., 1880, p. 125.
[4] British Med. Journal, March 8 and May 3, 1890, pp. 540 and 1007.
[5] British Med. Journal, Aug. 1, 1891, p. 251.
[6] New York Medical Journal, August 8, 1891, p. 143.

Neither can we offer satisfactory explanation why lead pre-eminently affects the nerves supplying the extensor muscles of the extremities and the muscles of the intestine, or why tobacco has a special affinity for the nerves going to the heart, or why diphtheria conspicuously leaves its impress upon the cranial motor nerves and some of the spinal. Yet such facts remain, and the lesson which they teach us to-day is, that inflammation may attack all classes of peripheral nerves alike, those of special sense as well as those of general sensation and motion, that the cause is wide-spread and common, and that the principles of treatment are identical.

Peripheral neuritis, in its broadest sense, therefore, becomes of intense interest and far reaching importance to both the general practitioner and the specialist.

PUERPERAL ECLAMPSIA AT SEVENTH MONTH. INDUCED LABOUR: RECOVERY.

By Geo. E. Fell, M. D., of Erie County.

October 30, 1891.

The presentation of an ordinary case of puerperal eclampsia to this society might be justified, when it is conceded that it is better to publish reports of cases which have an indistinct or unsettled pathology, than to lock them in our minds from the world so that no benefit can be derived from them, or medical knowledge advanced a single degree. The report of a *successful* case of a desperate nature may aid, and cannot lead astray, those who may in the future peruse it; and if we wait for a number of cases, we may never present any.

This case, however, was not an ordinary one, as the condition of the patient when operated on was most desperate.

Three physicians had attended the case before I saw it; consequently there must have existed some phases of uncertainty in their minds, as the efforts they made to retain the life of the patient were not meeting with favourable results, or they were entirely misdirected. The case sequentially presented was as follows:

Mrs. P. H., at six and one half months of utero-gestation, was taken ill with severe pain in the head, Tuesday afternoon, August 25, 1891. She suffered more or less severely until the following Sunday morning, August 30, when she passed into a comatose state, followed by spasms. Dr. B—— (homoeopathic physician) was called, and left some powders for the head symptoms. Later in the day he called a brother practitioner in as counsel. They decided that nothing more was to be done at that time. Dr. R——, a regular practitioner, was called, who excused himself from interfering in the case, as others were in charge. The patient was fast approaching that condition when earthly doctors would be of little avail—comatose, with convulsions every ten to twenty minutes, and respirations giving evidence of pulmonary oedema. I was

called at 6 p. m., Sunday evening, and made a guarded prognosis the moment I saw the case. Vaginal examination revealed a dilatable os. Finding that the other physicians had not made an examination, and would not return for some time, and with the life of the patient fast ebbing away, I appreciated that there was little time for useless ceremony. I called in Dr. Sydney A. Dunham to assist me, dilated the os, and with forceps induced labour, bringing into the world a dead foetus with a short cord three times around its neck. Placenta delivered by abdominal compression. Uterine inertia existing, overcome with ergotine hypodermically administered, followed by hot uterine irrigation. Haemorrhage slight, which was fortunate, as the patient was then anaemic. Complete coma during delivery and subsequently. Four hours after delivery another serious characteristic convulsion took place. The therapeutic measures at this time were as follows: Chloral hydrate in 20 grain doses; brandy hypodermically administered, followed by 3 grains of phenacetin, with liquid peptonoids internally, and mustard applications freely to the entire dermal surface. The result was that free diaphoresis took place within a few hours. The temperature at 10 p. m. was 104° F., and the pulse 126, weak. Oxygen gas was also used, but with little apparent benefit. Dr. Dunham remained with the patient throughout the earlier portion of the night. I again called at five in the morning, and found that the temperature had fallen to 100° F., pulse 108, giving the most satisfactory evidence of the wisdom of the treatment. The patient was sleeping, although there was yet no evidence of consciousness. At 2 p. m., Monday, the pulse was 138, and temperature 99° F. The general treatment for diaphoresis was phenacetin, and the mustard applications, which were frequently repeated; for the convulsions, chloral hydrate; and nourishment in the form of beef peptonoids. On Tuesday, the 1st of September, the uterine irrigation was repeated, thoroughly cleansing the womb of considerable septic matter. During the operation the patient first gave evidence of returning consciousness, having been in a comatose condition for about fifty hours. The patient was watched closely until the 4th and 5th of September (seven days after the operation), during which time the uterine irrigations were repeated daily. On the 6th of September, however, chills set in with frequent light convulsions, and there was no way to account for this except by the supposition that septic matter was being absorbed. The pulse at this time was 140; temperature 101°. The case was looking very serious. I instituted a more thorough series of uterine irrigations, using not less than two gallons of hot boracic acid water at each irrigation. The amount of septic matter coming away from the womb was very great. The operation was made four times in the twenty-four hours, with the most satisfactory results. The irrigation was kept up daily from that time until the 15th of September (seventeen days after

the operation) before I was satisfied that it could be safely discontinued. It is needless to state that albumen was quite plentifully found, albumino-retinitis present; but about the 25th of the month, under the treatment prescribed (alterative tonics), the albumen passed away, and examination, October 5, revealed quite a plentiful quantity of uric acid. The patient, however, was improving, and was immediately placed upon a suitable alkaline treatment, which gave the most satisfactory results, and she is now gaining flesh, and from all accounts is in better condition than she has been for some time.

Now this case presents some points of interest, and gives scope for thought which may be of practical value. We may first ask, What influence had the uric acid diathesis in the production of the puerperal eclamptic state? From the statements of the patient, she had evidently suffered with this condition at a former period, and was undoubtedly in a very bad condition to undergo the trials of utero-gestation.

The case of another patient, which might have a bearing upon this, may be mentioned.

A young married lady, at two or three months of utero-gestation, had a miscarriage. She was poor in health. Her physicians did not appear to aid her. She again became pregnant. About the second month I was called in to the case. The patient was confined to bed, had severe pains in the region of the kidneys and the bladder, all pointing to some interference with the eliminative functions of the body. Examination of the urine revealed a large quantity of uric acid. Repeated vesical irrigation, with suitable alkaline treatment internally, put her on her feet within a week, after she had been suffering acutely for some three months from non-elimination of effete substances. Now, had this case passed to the fourth or sixth month of utero-gestation, might it not have resulted in a toxic influence producing similar results to those witnessed in the puerperal eclamptic state just detailed to you? That a toxemic principle—a ptomaine or leucomaine, the latter derived from the abnormal activities of the tissues of the body—appears to be the agent producing the eclamptic state applies probably as well in the puerperal condition as others.

In a late number of the Journal of the American Medical Association, Dr. Culbertson has called attention to the observations of Semmola, which seem to point to the influence of a toxemic principle in the production of spasms. The import of this subject is so great that I may refer briefly to these demonstrations. A case of phlegmon in a man seventy years of age, with serious general and marked cerebral symptoms: A small portion of the patient's urine was injected into a rabbit, with the effect of reproducing the toxic symptoms in a more serious form than in the human patient. The treatment followed had in view the destruction of the circulating ptomaines, or the favouring of their elimination; worked satisfactorily. In the second case, there supervened "eclampsia and tetanoid symptoms." "The condition of the patient was most serious; temperature, 104° F.; pulse, 125; respirations, 55;" with other indications of a "most violent acute infection. . . . An injection of 5 c. c. of his urine into a guinea-pig weighing 250 grammes, and 10 c. c. into a rabbit weighing 1,050 grammes, was immediately followed by general tremors alternating with tonic convulsions and extreme dyspnoea, exactly resembling the clinical symptoms and convulsions seen in the patient, and clearly showing that part of the dyspnoea, the severity of which was certainly disproportionate to the extent of the diseased process, was of bulbo-paralytic origin. The doctor no longer hesitated as to the diagnosis, but declared that convulsions did not indicate an attack of cerebro-spinal meningitis, as he had supposed, but simply a most acute intoxication, due to the formation of new, special ptomaines in that great and mysterious bio-chemical laboratory of which the human organism, when attacked by influenza, is the seat. . . . Within twenty-four hours the convulsive attacks ceased, and the urine passed after their subsidence, although the pneumonic process existing continued with hardly any appreciable improvement. The temperature persisting at 104° F., showed itself on biological analysis to be inoffensive. In fact, the injection of 90 c. c. of his urine into a rabbit did not induce the slightest toxic manifestation,"

making the experiment a most valuable one to refer to, and one which leads us to believe that in most of the cases of puerperal eclampsia, were the toxic principle to be eliminated, we would be enabled to hold our patients. A young practitioner, within the last few days, called my attention to a case of puerperal eclampsia in the hands of another homoeopathic practitioner, in which the patient died from septicaemia. I most assuredly believe that my eclamptic patient referred to would have died from the same cause had not the uterine irrigations been most thoroughly and frequently applied; and might we not ask, right here, whether very many of the patients who die from puerperal eclampsia might not be saved were the toxic substances which may be absorbed through the uterine channels properly removed after the production of induced labour.

Another lesson which a case of this character teaches is the importance of watching carefully the condition of women during the period of utero-gestation. The medical history of my patient, as obtained from her mother, is so unique in character that I cannot but report it, as indicating that she was rightfully entitled to eclampsia of a puerperal or any other nature. When a child, about six months old, she had a serious attack of cholera infantum. At about five years of life whooping-cough and measles took possession; at ten years, scarlatina; at eleven years, jaundice; at fifteen years, diphtheria; at sixteen years, cystitis;—and, notwithstanding all this, I am living in hopes that I may see her continue to improve, have a little one, and possibly become a healthy mother.

EMBOLISM OF A BRANCH OF THE PULMONARY ARTERY FOLLOWING CHILDBIRTH. OXYGEN INHALATIONS: RECOVERY.

By George E. Fell, M. D., of Erie County.

October 30, 1891.

The following case has recently been discussed in detail, but not before the members of this Association. As it has an important practical bearing, I take the liberty of tersely detailing the facts connected with it. It is presented with the belief that it is probably the first instance of life having been saved by this means in a case of embolism of a branch of the pulmonary artery.

A physician attended a lady in confinement, and after delivering her at 5 a. m., everything appearing to be natural, he left her. He was called again at 9 o'clock in the morning, and found her suffering from great dyspnoea. He was a man of wide obstetric experience, and had seen such cases before, so he promptly made a diagnosis of embolism of the pulmonary artery or its branches, and predicted a fatal issue. When he returned, at 11 a. m., he found that a homoeopathic practitioner had been summoned hurriedly, as the patient was thought to be dying. About 2 p. m., I received a request by telephone to come quickly to see the sister of one of my personal friends, and at the same time the statement was made that the physician already in attendance would be glad to meet me in the case. Upom my arrival at the house I found that the physician had gone out for a short time, and owing to the pressing nature of the symptoms—the patient was gasping and cyanotic, and in extreme danger—I at once sent for some oxygen, and, as soon as possible, began its administration. My idea in doing this was to supply to the lung tissue left in functional activity sufficient oxygen, if possible, to keep up life, with the hope that the embolus would eventually be absorbed. The patient could only lie on her right side, and she said that she felt an obstruction at a certain point in the right lung. Auscultation showed the left lung to be normal, and the right lung oedematous and in but

partial function. The inhalation of oxygen gave immediate relief; in fact, the inhalation could not be discontinued for even a few minutes without causing a return of the dyspnoea. It was necessary to give the oxygen continuously for four days, using a total quantity of oxygen of nearly 1,200 gallons. There was albumen in the urine, the lochial discharge had ceased, and there was no secretion of milk. I then adopted a procedure which I have already reported to the Association, and which consisted in irrigation of the uterus with the patient in the "laterodorsal position," in this case the only position possible to treat the patient in. This made the lochial discharge more abundant, and a sufficient flow of milk was brought on by faradisation to enable the mother to nourish the child for a considerable time. At present, the albumen has disappeared, and the patient has made a satisfactory recovery. There was no question in the minds of those who saw the case that death would have ensued had not the oxygen gas been administered.

TREATMENT OF DISEASE OF THE KNEE JOINT IN ITS CONVALESCENT STAGE.

By T. M. Ludlow Chrystie, M. D., of New York County.

October 30, 1891.

For pathological reasons, diseases of the joints have been divided into stages, generally three, in order to indicate the progress of the disease from the invasion of the articular structure to its destruction. There the consideration of the affection ends. But after appropriate treatment the disease is arrested, and there sets in a regressive stage, and finally a convalescent stage. In these latter stages, which are generally slighted, professional skill will find an interesting field.

The treatment of knee-joint disease during its progressive stage need not occupy us here. The patient having been brought, by any of the numerous therapeutic methods, to a point where the disease is cured, he is usually left to himself to gradually get the use of the limb, possibly with the caution not to injure or strain the affected joint—a caution which operates adversely by keeping too much attention upon the weak joint, and thereby affecting its nutrition. If any such care is needed, it must be of a more definite and reliable character. But the disease in some shape or other returns, and it is then stamped as tuberculous or fungoid, or due to a loose or floating cartilage; and there must be either excision or amputation, and the function of the joint must be sacrificed.

There are cases of malignant disease of the knee, as well as of the above mentioned conditions, for which many cases susceptible of restoration to health are mistaken, because of the tendency to a recurrence of the disease, when such recur-

rence is due to a failure to pass the patient safely through the progressive and convalescent stages. I have even found that in a tuberculous diathesis the disease of a joint does not necessarily partake of a character similar to the diathesis, but yields to local therapeutic measures. Most, if not all, of these limbs are susceptible of restoration to usefulness by a conservative and less destructive procedure than excision, if they receive the benefit of professional skill combined with mechanical precision.

Bony ankylosis, from knee-joint disease, or from treatment of it, is rare. Fibrous ankylosis—whatever that condition may be—leaves the joint stiff, but too unsteady for utility; at the same time, if not of too long standing, it can be taken advantage of in restoring to the joint its function, that is, the mobility of a ginglymoid articulation. But it must be done by means of voluntary muscular action, and with an appreciation of such conditions as I am about to present. Let the healthy lower extremity be supported by the surgeon's placing one hand under the lower third of the thigh, and the other hand under the lower third of the leg. The patient is then asked to rest the weight of the limb in the doctor's hands,—the muscles, in other words, to be relaxed, or devitalised—to use a term from Delsarte—so that the knee joint is not held by them. It is difficult to obtain such condition of the muscles in some cases, but as this is only an illustration of the point to be demonstrated, a proper subject can be selected. When the muscles of the knee joint are felt to be relaxed or devitalised, let there be made a very slight, quick lateral movement of the lower third of the leg. There will be felt and heard a click, or bump, at the knee joint. Now, after a period of rest from use, enforced by the treatment or in the course of the disease, the muscles of the knee joint are in this devitalised condition, and any attempt to use the knee joint in walking or standing exposes it to a succession of injuries of this character. If a so treated patient can walk at all, and he does so with the knees exposed to view, the lateral jerk of the weak knee can be

detected. This detection sometimes requires a practised eye, though it can be plainly pointed out when so detected by comparison with the behaviour of the sound knee.

The anatomical structure of the lower extremities can here be called to mind in explaining these phenomena. The heads of the two femora are separated by the width of the pelvis, and the top of their shafts placed still farther apart by their necks. If the bones of the lower extremity were parallel to the median line of the body from the hip bone to the ground, the knees and feet would be too far apart for comfort and appearance; our locomotion would resemble the waddle of a duck, though in an architectural point of view the construction would be good for the purpose of bearing superincumbent weight. The oblique direction of the femora gives the parallelism and closeness of the legs below the knees, and to make up for the want of steadiness from such change of direction, large, strong muscles are provided to maintain the hinge-like function—diarthrosis ginglymus—of the knee joints. The thigh is consequently the most muscular part of the body. The larger thighs of the adult female compared with the male are owing to the larger muscles required to supply steadiness for a greater obliquity of the femora, caused by the wider pelvis of the female. In this oblique direction of the femora we have a predisposing cause for traumatism in a previously damaged knee.

The following history will serve as illustrative of this point:

Patrick O'Connell, aet. 19, employed as orderly or nurse at the Ninety-ninth-Street Reception hospital (Department of Charities and Correction), was disabled every few months by synovitis of the left knee, and was on that account brought to me in August, 1881, by one of the surgical staff. His duties required him to be active upon his feet; but he had not received any injury, and there was no assignable cause for the recurrence of these attacks of synovitis. They yielded to treatment, and on recovery he could go about as usual. There were cicatrices over the left tibia and right femur, but they had been healed a long time since, and were not considered in any way connected with the synovitis. His health was good. He was tall, of spare, muscular, but apparently well made

form, and had a symmetrical gait, stepping firmly on both feet. The function of the knee joint appeared good; but in searching further I had him strip, and, placing my hands on the crest of either ilium, discovered a want of symmetry in the length of the lower extremities, the left being $1\frac{1}{8}''$ shorter than the right. This had not been suspected by any one, and the patient was unaware of it. When attending school some years previous, however, he remembers being chided by the master, because, when sitting in class with other boys, he did not place his knees on line. He never knew it was because there was any difference in the length of the legs. On having him walk across the room several times, a quick lateral movement of the left knee at each step could be detected. The force or impact from bringing the foot a distance of $1\frac{7}{8}''$ to reach the ground was received on the knee in a lateral direction, and added to the natural lateral change of direction a sufficient strain to be an ever-present source of traumatism. As the difference in length was a product of a too slow growth of the left lower extremity, or a too rapid growth of the right (neither being a morbid process, it cannot be laid as a fault to one limb more than to the other), the change from equal to unequal lengths of the lower extremities was so gradual that the patient was able to accommodate his body to a symmetrical gait. The unconscious effort in accomplishing this feat brought in play the lateral change of direction at the knee joint, as already explained. The difference in length was made up by a cork sole for the left shoe; the lateral jerk of the knee disappeared, and at the last report, three years after this, he from that time had had no more trouble with his knee.

In speaking of relaxation of the muscles from a period of disuse, the word relaxation applies only to a limited arc of motion. Devitalisation is, perhaps, a more appropriate word to express the muscular condition, which is one of inability of one set of muscles to relax in response to the active contraction of their antagonistic set, as well as a condition of feebleness of muscular power. In whatever position, or degree of flexion or extension, the knee joint is left after the disease, there is an arc of motion beyond which the knee cannot go. It may be a fraction of a degree, or twenty or thirty degrees in extent. The muscles will not relax, will not let go, beyond this limit. Either it is because there may exist muscular retraction, though the resistance is not generally of that character, or because the motion brings in contact parts of the articular surfaces not in a proper condition for such contact: the non-use of the joint has prevented the

necessary amount of synovial secretion. The impact of so holding or arresting the motion comes upon the articular surfaces with sufficient force to be considered a traumatism. The patient does not complain of pain, but dreads to have the knee reach that limit of motion, and often does not allow any motion for fear the limit may be reached. This may be called an hysterical joint, and does resemble it; but, at all events, it is present as a sequel of the disease, and if the condition is not counteracted, the use of the knee joint cannot be obtained. In all joints affected by inflammation there is a hysterical element as a sequel, and confidence or a feeling of safety must be imparted to the patient before that joint can be used.

The synovial membrane is here the largest and most extensive in the body. In the interior of the joint are the posterior crucial ligaments, which are blended with or inserted into the inter-articular cartilages, and are surrounded by the synovial sac. When the movement of extension is performed beyond or up to the normal or the acquired limit, there is a strain upon these ligaments, and injury done the connecting synovial membrane. A synovial pouch of this membrane lies under the tendon of the quadriceps extensor muscle, as it passes upwards from the patella and is held in place by the subcruraeus muscle. This is unduly compressed on flexion of the knee joint, if the extensor muscle does not relax in unison with that motion. The membrane extends laterally under the vasti muscles, and is secured to the intercondyloid notch by a prolongation, the ligamentum mucosum. It is so intimately blended with the tendons, ligaments, and cartilages of the knee joint, that, if not in a perfect condition to perform its function, it cannot but be injuriously affected if an unevenly distributed pressure is placed upon it by mechanical unsteadiness of the joint in any direction, or by unbalanced muscular action. And yet the function of this membrane is the secretion of the synovial fluid, a function which cannot be accomplished except as the result of use and motion of the joint.

In applying therapeutic measures in the beginning of treatment, in all probability the first and principal one will be *rest from use*, enforced at once, and complete. But on the arrest of the inflammation, we desire to procure *rest from disuse*, and generally make a mistake by applying that at once, and complete, too. To continue rest from use after the inflammatory condition has gone, keeps up an impairment of nutrition, which will as surely destroy the joint as does the disease; but to *at once* institute the use of the joint without giving some definite protection as to the extent of this use, while the nutrition of the joint gradually furnishes its structures with vitality to resume their functions, is equally pernicious.

Briefly to illustrate: A patient having the knee joint at rest for six months or a year, with disappearance of all inflammation, is placed on his feet, with crutches or apparatus arranged to receive the impact of the body, but not to take that weight from the limb; the foot is allowed to reach the floor, and the limb to feel the stimulus of such "grasping" of the floor, with a sense of being protected from having too much thrown upon it, and though there may be added a height of not more than one inch to the shoe of the sound limb, it is done only to remove from the affected limb the feeling of a superincumbent weight beyond its capacity, and to lessen the amount of muscular effort in lifting the limb; but in no sense to make it pendent, as is so often and injuriously done. The apparatus should be provided with a joint at the knee, which can be free, or locked immovable, at the will of the patient. The construction of this joint should be such as not to permit lateral motion, and yet move easily and smoothly. This involves care on the part of the workman. The hinge-like surfaces are best made parallel and smooth for this purpose, by being cut from a solid bar of steel by the revolving cutters of a milling machine. Much of the lateral steadiness will also depend upon the bolt's having a sufficiently large diameter—a diameter of from $\frac{1}{2}$ to $\frac{5}{8}$ of an inch for an adult case.

The arrangement to lock or free the joint I have arranged to reach sufficiently high to be worked by the patient without changing position, and to be placed permanently free or not,—all to be changed instantaneously to motion or no motion of the knee joint without disarranging the clothing and at the will of the patient. When the joint is free, it stops the limit of extension similar to the joint of a carpenter's rule, and in a vertical position the weight of the body is thus received on a perinaeal or ischiatic strap. An arrangement to limit the flexion of the knee is also important, and must be carefully adjusted to an arc not quite so large as that of which the joint is capable. This may be increased as the knee joint acquires greater capacity for flexion, but only by following its increase of motion, not by exceeding it, in however slight a degree. From the bar on the outer side of the limb furnishing the arrangements mentioned, are attached two firm bands, one above and one below the knee, which, passing behind the limb, give attachment to plates supporting it laterally above and below, but not against, the knee joint. The shoe bears a steel which receives the lower end of the outside bar of the apparatus by a slip-joint, and is thus readily applied by the patient after the shoe is secured to the foot. An important part is to have the heel of the shoe reach out underneath the steel which furnishes this slip-joint.

At night the knee must have local rest, so it may recuperate from the use it receives during the day, and this must be provided from a lateral as well as a posterior aspect; in other words, must rest at night immovable. It must be in a position flexed to a degree at which the patient finds rest, and this can be ascertained by experiment. Either a gypsum shell may be used, or, better, a steel frame composed of two steel bars bent accurately to the contour of either side of the limb in its flexed position, the one on the outer side reaching from the trochanter to within an inch of the ankle. The two bars are connected by three or four posterior steel bands sloped to fit the posterior line of that part of the limb with

which they come in contact. The inner bar bears an oval plate bent to receive the inner side of the knee joint, against which it should find lateral rest. Leather, canvas, or web straps should be secured to receive the posterior surface of the limb by being adjusted to its shape at, above, and below the poplitaeal space. The frame is further steadied in place by adhesive straps on either side of the leg, received by buckles at the lower end of the frame. As there is not any traction or counter-traction, they need be only a strip ¾ or ½ inch wide, and do not need any bandage, so that the action of the muscles is not interfered with.

We now have a means of carrying out a definite plan for giving to the knee joint a protection from the traumatism arising from locomotion, while at the same time the limb is acquiring restoration from disuse. It is permitted to receive weight and concussion suited to its strength, but is protected from the traumatic lateral jerk already spoken of: it has flexion and extension, but limited to an arc of motion suited to its capacity; and it is given local rest at night. The use of the limb under these circumstances is followed by increase of mobility and return of strength. The atrophy above the knee, or the swelling and puffiness of the foot and leg, disappear. The backward displacement of the head of the tibia is gradually reduced by the action of the quadriceps extensor, which has been inert for want of some limit to its action upon the joint. All this, however, requires professional skill and precision throughout the period of convalescence.

DISCUSSION.

Dr. C. A. Leale, of New York county, said that from the cicatrices about the knees he inferred there had been an old periostitis, and probably necrosis in early life. He would like to ask if, in the author's opinion, the long disuse of the limb during this period of necrosis had had any tendency to produce the shortening.

Dr. S. E. Milliken, of New York county, asked if the shortening had been followed by lateral curvature of the spine with rotation.

In reply to the first question, Dr. CHRYSTIE said that the necrosis had been so slight as not to lay up the patient. The want of symmetry referred to by Dr. Milliken is a very frequent occurrence, but he had never found any evidence of its causing true lateral curvature. He had known over two inches of lateral deviation without any rotation.

TYPHOID FEVER IN CHILDREN.

By W. D. Garlock, M. D., of Herkimer County.

October 30, 1891.

I shall try to present for your consideration, as briefly as I may be able, some remarks on the peculiarities of typhoid fever as it occurs in children as compared with the same disease in adults, without making any effort at exhausting the subject or presenting a full picture of the disease itself.

We say a patient has typhoid fever, meaning thereby that certain symptoms are present, due to a definite cause, which is supposed to be the typhoid bacillus and the typhotoxine which is elaborated by that germ. We speak of the disease as if it were an entity, but it is not, and it is only specific in that there is supposed to be a certain specific cause which enters the system and disorders it.

There are presented for our consideration,—(1) an acting cause; (2) a body acted upon; (3) the results, or what we ordinarily speak of as the lesions and symptoms of typhoid fever.

The first part, or the acting cause, will not be discussed at any great length, but only to develop the peculiarities of the infection of children by the typhoid poison, because it is the same germ in children as in adults.

The germ theory of disease is unquestionably applicable to typhoid fever. The specific agent is swallowed with infected food or water, and is carried to the stomach, and if not destroyed there, it passes into the alkaline intestines, where it finds a suitable culture medium and where it rapidly multiplies, and, being taken into the system through the intestinal walls, produces certain local lesions and rather variable general symptoms. The ptomaines produced by the germs are also absorbed, and add their quota to the complexus of symp-

toms. The germs exist in large numbers in the intestinal contents, and in the urine in cases where it is albuminous. These excretions, passing out of the body, become diffused through drains, cesspools, etc., and, in ways too numerous to mention, are liable to infect wells, soil, food, clothing, and almost all the utensils and surroundings of inhabited places. Animals may ingest the infected things and carry the germs to distant places, and thus the poison may spread from place to place. Wind may transport the dried germs, and water may carry the excretions in creeks and rivers to be drunk by men and animals, or frozen into ice to poison, as well as to cool, the water that quenches our thirst.

It was formerly thought that children were not very liable to typhoid fever because the disease was not recognised, but passed under the name of remittent fever. Children probably do not drink water from so many different sources as youths and young adults, who wander about more in work and pleasure-seeking; but they eat dirty fruit, and put many of their soiled playthings and their dirty fingers into their mouths, and are thus exposed. They also play with dogs that may have waded in infected streams, and with cats that may be carriers of infection. Children inhale air from nearer the ground than grown people because of their short stature, and this air is more liable to contain the germs and exhalations arising from decomposition going on in the soil, than air that is higher up and more diluted by the general movements of the atmosphere in wind or according to the general laws of the diffusion of gases. It is also probable that children are more liable to be affected by ingested germs than adults, because of their softer and more easily penetrable intestinal mucous membranes, and because their gastric secretions may not be so well able to destroy ingested germs.

We have now considered the acting cause, or the first of the topics proposed for discussion; so let us turn our attention to the second topic, the organism acted upon, and the third, the effects of the cause on the organism, or the lesions and symptoms of typhoid fever. These are taken together

because in this way the bearing of the data may be made plainer. In most cases the symptoms are described first, and the peculiarities of the child organism made to explain, so far as possible, the differences between the symptoms of typhoid fever in children and those in adults, thus reversing the sequence of the topics proposed.

It is probable that the specific lesions in the intestinal tract, and in the adjoining lymphatic glands and vessels, are largely due to the germs themselves, while the general febrile symptoms and the derangements of the nervous system are probably largely due to the continued action of the ptomaines produced by the germs, and the other alkaloids of decomposition elaborated in the various media of the body but mostly in the intestinal contents.

Let us briefly consider the general complexus of symptoms presented by an average case of typhoid fever in a child, and then discuss the various symptoms and try to find out why things take the peculiar turns they do in children.

We find that the child begins to complain of not feeling well, but does not particularly locate his trouble. He is tired and cross, loses his appetite and relish for play. These symptoms gradually get worse, and we find feverishness and headache coming on and increasing.

The child lies down, and is finally put to bed and the doctor called. An examination shows a furred tongue with anorexia, drying of the secretions generally, with, in short, the general symptoms of mild pyrexia. The child is inclined to be drowsy and peevish. These symptoms gradually become more marked, the stomach becomes irritable, and the doctor finds that he has a sick child on his hands without being able to make a satisfactory diagnosis. The parents want to know what is the matter with their child, and the doctor has to tell them that he must wait for the full symptoms to develop before he can be positive.

The temperature, and the symptoms depending upon it, increase, and reach their acme about the fifth or sixth day. There may be a little abdominal pain and tenderness with

bloating, but not so much as would be looked for in adults. The temperature remits considerably in the morning. Diarrhoea may come on, but is not apt to be characteristic. The pulse follows the temperature quite closely. There is usually some cough, and bronchitis seems to be present. The symptoms continue with quite marked variations and irregularities for from ten to fifteen or twenty days, and general difervescence with marked remissions occurs, sometimes rapidly, sometimes gradually, and the child passes on to convalescence.

This picture lacks the definite typical outlines of typhoid fever in adults, but it is the same disease; and we will now look a little more in detail at the particular symptoms, and try, if possible, to find reasons for the peculiarities of the symptomatology of typhoid fever in children.

The most prominent symptom of the disease is the febrile movement. This begins sooner and rises more rapidly to the acme in children than it does in adults. The fifth rather than the eighth day marks the height to which the temperature may be expected to go. There are more marked remissions than in adults, and they come more irregularly, and not so generally in the morning. The temperature does not generally run so high; but 102° F. to 103½° F., rather than 103° F. to 104½° F., is the usual evening temperature. The invasion does not so commonly present the regularly ascending serrated temperature curve looked for in adults. The fastigium is shorter and more remittent in character, and the difervescence comes sooner, and generally more rapidly, than in adults. The whole duration of the disease is much shorter and milder. Out of eighty cases reported by Henoch, seven cases lasted less than ten days; thirty, from ten to fifteen days; sixteen, from sixteen to nineteen days; fifteen, from twenty to twenty-three days; and only twelve cases the usual twenty-eight days of the typical typhoid fever in adults.

The cause of the shorter course is found in the intestinal lesions being less marked in children than in adults. Rilliet

attributed this feature to the manner in which the Peyer's patches are affected by the poison. In children the proliferation in Peyer's patches and the solitary follicles of the intestine is generally limited to the lymphoid cells in the follicles forming "plaques molles," as they are called, in which the proliferation does not involve the underlying mucous membrane as it does in adults. In children the proliferated cells undergo fatty degeneration, and are absorbed without the formation of ulcers. These ulcers almost always form in adults, but are the exception in children. The febrile movement of typhoid fever in adults is due to two causes,—the direct effect of the germs, and the typhotoxine being absorbed and acting on the heat mechanism. This causes the fever during the first ten to fourteen days. After this time the fever is largely due to the absorption of septic matter through the open ulcers in the intestines. Children, having these ulcers only exceptionally, generally escape the secondary fever due to septic causes. This is the explanation of the shorter and milder febrile movement of typhoid fever in children.

The abdominal symptoms, so characteristic of the disease in adults, are commonly but slightly developed in children. There is little abdominal tenderness, bloating, or gurgling, because the Peyer's patches do not break down. Perforation is much less likely to complicate the case, and the same is true of haemorrhage from the bowels. Diarrhoea being due rather to the general catarrhal state of the mucous membrane lining the intestinal tube, caused by the special lesions, is, of course, less liable to be troublesome in children; but the intestines of children are more easily irritated in proportion to the acting cause than those of adults, so there is often more diarrhoea in children than the abdominal bloating and tenderness seem to account for.

The general effect of the febrile condition on the nervous system is different in children from what it is in adults. Children sleep more during the febrile process than adults, and the younger they are the less they complain of head-

ache. In adults we look for considerable headache during the first week of typhoid fever; but in children, particularly if they are under five years of age, there is generally but little headache.

The delirium of children is more changeable than that of adults: they have seldom a fixed idea running through the delirium for several hours or days. This is but natural. The changing thoughts and impulses of children are connected largely with their play or their contentions with playmates, and do not plough the deep and long furrows in the brain that come with business cares and the routine of bread-winning.

The nervous system in children is more impressionable than in adults. Little things disturb more; a little sleep relieves more. The paths through which the centripetal nervous impressions reach the brain, and are reflected thence as centrifugal impulses to the various organs, are not so well beaten in children as in adults, and the measure of the reflex energy is not so well controlled, nor is its direction so well established. The repetition of the reflexes consequent upon the increased years, in adults, leads to an habitual exactness in the energy of the centrifugal part of the reflexes which control the organs under the domination of the sympathetic and trophic nerves; but in children, the education of the reflex centres, if I may use the term, is not so complete, but centripetal sensations awaken varying degrees of reflex energy. Habits of reflex activity are thus established, which, once formed, tend to cling to the reflex centres during the remainder of life. We have always recognised the force of habit, and that age fixes these habits more and more; and it seems to me that the mobile condition of the voluntary and sympathetic systems and their reflexes, and even of the variable effects of medication and other remedial measures in children, may, to some extent at least, be due to this condition of the central nervous organs. The discharge of centrifugal energy is, to a certain degree, an unknown quantity; and this must be remembered in the management of children.

This may explain the more fluctuating temperature of children when affected by febrile diseases. Exercise is liable to cause more of a rise in temperature in children than in adults. The muscles contain both "contractile stuff," as it has been called, and "thermogenic stuff," and the impulses that cause the functional metabolism of the "contractile stuff" overflow and excite the "thermogenic stuff," causing the rise in temperature. These reflexes are less well regulated in children than in adults. The work done by a contracting muscle only represents about 20 to 25 per cent. of the total energy liberated by the oxidation, and the remainder appears largely as heat. As the muscles produce 75 to 80 per cent. of the total heat production, the importance of keeping the muscles quiet is evident.

The sympathetic nervous system seems to be in a disturbed condition in children to much the same extent as the heat-controlling apparatus. This is shown by the local blushes on the face, neck, and upper part of the chest, that so frequently come and go without any apparent cause. Exposure to air often causes these blushes to disappear. These sometimes resembles the eruption of scarlatina, but have not its permanency, and are diffused rather than punctate or confluent.

The typhoid eruption is oftener absent in children than in adults.

The surface of a child's body is greater in proportion to its weight or bulk than is that of an adult. This allows of a greater chance for heat loss, and radiation generally suffices to dissipate the heat, so that sweating is less common in children in the febrile condition. There is, however, more of a tendency to drying of all the secretions in a child, than in an adult, during fever. The salivary and pancreatic secretions are lessened. The drying of the intestinal secretions increases the liability to constipation. The kidneys need a little more watching than in adults.

Bronchitis is generally more common in children. It sometimes is quite troublesome. The physical signs are more

marked; the breathing is harsher and sometimes almost bronchial, but it must be remembered that there is a bronchial element in the normal respiration of young children. Râles, fine and coarse, are prevalent. Lung complications are liable to raise the temperature more in children than in adults.

Sudden changes for better or for worse are more liable to occur in children.

The general symptomatology in children is milder than in adults, and although individual symptoms may in some cases be more prominent, yet typhoid fever is a comparatively mild disease in children: the mortality is only from 1 to 5 per cent.

The diagnosis, because of the indefiniteness of those symptoms ordinarily depended on, is often quite difficult, and must often be withheld until the later stages of the disease.

Time will not permit me to discuss the complications or treatment; but if I have pointed out the physical basis, and the organic and physiological laws and conditions which underlie and explain those features of typhoid fever in children which differ from the corresponding features in adults, my work is done. I feel, however, that much that has been offered is to quite an extent theoretical, and that authorities ought to have been cited more than they have been, but brevity has seemed so desirable that I beg of you to overlook these imperfections.

DISCUSSION.

Dr. A. L. Carroll, of New York county, said that he knew of no condition where the diagnosis was more obscure than in many cases of typhoid fever in children. He was inclined to believe that it was much more common than the text-books would lead us to believe, although he was not quite sure that *all* cases formerly called infantile remittent fever were really enteric fever. Infants were not very susceptible to typhoid fever, on account of the imperfect development of Peyer's glands. Recent researches had shown that the Peyerian gland lesions were not confined to typhoid fever. We all knew that in severe forms of malarial fever there might be ulceration of the colonic glands, and even of Peyer's patches, and often dysenteric ulceration, reaching above the ileo-

caecal valve. Dr. Carroll said that two or three years ago he had expressed before this Association some doubts about the correctness of the classification of typhoid fever in adults. In view of these facts, and the obscure symptomatology of the disease in children, a positive diagnosis was often a matter of great difficulty. As the mortality among children was not large, as had been stated by the author, there were but few opportunities for pathological investigation. Most of the cases which he had considered instances of typhoid fever in children had occurred in highly malarial regions. He believed there was still a large number of cases which really belonged under the old title of "infantile remittent," and he was confident that he had often been misled in the diagnosis.

The PRESIDENT said that several years ago he had seen an obscure case of this kind, in consultation with Dr. Alonzo Clark and two specialists on children's diseases. The consultation developed very strong differences of opinion, Dr. Clark taking the position that the case was one of typhoid fever. Dr. Clark stated at that time that diarrhoea was not an essential feature of this disease, and that, although he believed Peyer's patches were involved, and had seen many cases which he considered to be typhoid fever, he had never had an opportunity to verify his diagnosis by post-mortem examination. He was of the opinion that infantile remittent was of rare occurrence.

The President remarked that the position then taken, he thought, represented the position of the profession to-day.

CARCINOMA MAMMAE: WHAT MAY WE EXPECT AFTER OPERATIVE TREATMENT? HOW MAY THE RATIO OF MORTALITY BE DIMINISHED?

By John A. Wyeth, M. D., of New York County.

Read by title, October 30, 1891.

It is not my purpose to give any detailed personal experience with cancer of the breast: such a report would occupy too much time, and would add little or nothing to the knowledge of this subject already acquired from others.

If I may quote the statistics of the distinguished French surgeon Terillon, published in the *Bulletin Général de Thérapeutique* for May 15, 1891, I venture to say I shall give with these, practically, my own results, as well as those of other surgeons who have had any considerable experience in the operative treatment of cancer of the breast. These are of extraordinary value by reason of the careful study of each tumor removed, and the close observation under which each case was kept subsequent to operation.

Of forty-eight patients operated upon for cancer of the breast between the years 1880 and 1890, and reported in 1891, forty-two were dead, and the remaining six living cases all had suffered a recurrence of the disease. One patient is still living, seven years after the single operation, with recurrence of the tumor. Four other cases survive, with recurrence at the periods respectively of three and two years, one year and three months, and about one year. Of the cases which died, and of which the history is completed, the longest survival is six years. Two survived this length of time: in one of these (sixty-eight years of age) the neoplasm recurred in the vertebral column with fatal result. The other, forty-five years old at date of operation, submitted

to a second operation in two years and six months. One survived four years and six months. Two survived four years. Three survived for three years. Ten survived from two years to two and one half years. For one year and over, and less than two years, there survived fifteen. The remainder perished within less than a year after operation, varying from three to seven months.

In my cases, one survives eleven and one half years after the last operation, there having been an operation one year prior to this by Mr. Pollock, of London. The axillary glands were not involved in this case. She is seemingly in perfect health to-day. Another case, in which the glands were involved and the axilla cleaned by dissection, the patient survives without recurrence, and is also seemingly in perfect health at this date, five years and ten months after the operation. In both of these cases a careful microscopical study of the tumors was made, and both were carcinoma.

In view of the fatality which follows the appearance of carcinoma of the breast, we must rank it among the most malignant of diseases to which the human family is subject. In my opinion, the hope of decreasing the great mortality from carcinoma mammae is not so much in wide and free extirpation of the infected gland and axilla and all adjacent and suspicious tissues, but in the early recognition of the disease, and in the immediate and wide removal of the organ in the very commencement of the invasion. This is almost our only hope. It is held by many excellent surgeons of experience, that when the disease has travelled along the lymph routes into the axillary glands, a cure cannot be effected; that, after a period of a few months or years, recurrence *in loco*, or in the glands of the neck, or in some more remote part, will occur. Terillon's cases add immense weight to this opinion. I do not accept such conclusion, however grave I do admit the prognosis to be after axillary invasion.

It seems to me that in this march of the disease there must come a time when glandular infection is just occurring, and is

still confined to the body of the lymphatic glands and to the ducts which lead into them from the neoplasm. Why, then, abandon hope in any case without a heroic effort at cleaning away all the loose contents of the axilla? In some cases, if only a very few, we may effect a perfect cure by this procedure. In the failure to recognise a tumor of the breast in the very earliest stages of its existence, who is to blame,—the public, or the profession? I think both are at fault, and chiefly the profession. It is in our capacity as educators of the public in this disease (as in many others) that we shall reap our reward, and not as thorough and brilliant operators.

Suppose that every woman in the civilised world knew that the presence of a lump in her breast was a serious threat upon her existence, that eighty-three out of every hundred such growths were cancers, and that after the thirty-fifth year this enormous proportion was increased, until, after forty practically all tumors coming in the breast meant death unless they were removed at once and thoroughly, and that if then removed a cure could be effected and her life indefinitely prolonged; suppose she knew, as we know, that cancer is a local disease and is curable by removal; suppose she knew, as we know, that to take an anaesthetic, properly administered, and have her mammary gland removed by a careful and competent surgeon who knows what cleanliness means, involves no more danger to her life than to walk along Broadway from Denning's to Arnold & Constable's: do you think that any sensible woman with these facts in mind would foolishly be guilty of suicide by concealing her misfortune, and help to fill our graveyards by her own unnecessary and untimely death?

In my entire experience I do not know of a patient that died as a result of operation for removal of the breast, even when the axilla was dissected out. Terillon in his list did not lose one. I have inquired among several colleagues of large experience, and since antiseptic surgery has been in vogue I have not heard of a single death.

It seems to me, then, that we are in duty bound to convey

this information to the public. This can scarcely be done through the medical periodicals. The public do not read these journals. I would suggest that this Association take this matter in hand. Our great magazines are excellent channels through which to reach the public. The criticism which might attach to an individual in such an effort could not attach to an association composed of representative men. If we are philanthropists, we must lay aside prejudice. Let us be doctors in truth, for doctors are teachers.

DISCUSSION.

Dr. J. D. Bryant, of New York county, said,—I will claim your attention only sufficiently to submit for consideration certain requirements in connection with these cases, the strict observance of which, in my opinion, will formulate the practical answer of the question,—

What may we expect after operative treatment for carcinoma mammae?

First Requirement—An early recognition and prompt acknowledgment by the patient of the existence of a growth in the breast.

The ideal fulfilment of this requisite requires that the patient herself shall have detected the growth, and thereafter have soon informed a lay or professional friend of its presence. The common and vacillating course of the patient in these cases is moved by the desire of secrecy, the fear of the worst, and the dread of an operation. The desire of secrecy is stimulated by family and personal pride, and, too, by the sentiment that leads us to hope for the best while we shrink from the realisation of the worst. Though it may never be possible essentially to better this state of things without changing radically the instincts of human nature, still, I respectfully submit that the effort should be made, both in health and disease, to impress the fact on all alike, that the hope of ultimate relief from this affliction depends very largely indeed "on an early recognition and a prompt acknowledgment by the patient of the existence of a growth in the breast," followed at once by the

Second Requirement—A prompt consultation with a careful, conscientious, and candid physician.

The consultation should be had promptly, and the diagnosis should be made carefully, for obvious reasons. A careful differential diagnosis contemplates for its purposes not only the consideration of all facts relating to the characteristics of mammary growths, but it also requires that an explorative incision to the growth be made in cases of doubt, to determine the nature by aid of its macro- and microscopical appearances. In

no instance should important time be wasted in making the fine distinctions incidental to hair-splitting diagnoses.

If a reasonable doubt exist as to the exact nature of the growth, the patient is entitled to the benefit of the doubt, and should be given the advantage to be gained by its prompt removal, as it is far better to dispense with an organ the purposes of which can be quite well supplemented, than to expose its possessor longer to the baneful influence of a possible malignant growth, with no chance thereafter of regaining a lost opportunity. The physician should be conscientious and candid, else he may not urge prompt action; and, too, if otherwise, he may be moved to sentimental inactivity by sympathy with the patient, or from fear of the outcome. He should sound the alarm with no less certainty than he would do were his patient's house in flames. He should advise at once

The Third Requirement—Immediate, wide, and thorough removal of the growth by cutting along with all tissues having special functional associations with the gland, irrespective of any evidence of disease of those tissues.

Immediate removal is understood to mean at the earliest possible convenience of the patient; no unnecessary delay on the part of any one should be permitted.

Wide removal should be construed to mean that not less than two inches of healthy tissue should intervene between the outer limits of the growth and the lines of incision; and, too, it means a greater margin than this even, if it be possible to close the wound properly after the removal of the growth. The inability to close the wound at any part of its course, or throughout its entire extent, should not cause the surgeon to narrow the limits of the incision in the least, since the open space, no matter how large, can now be immediately covered by cuticle-grafting, after the manner of Thiersch.

Complete removal of the gland should always be supplemented with removal of the adjoining fasciae, muscular tissue, and the lymphatic glands of the axilla, even though no appreciable naked-eye manifestations of disease be present in these structures. Manual examination of the axilla, for the purpose of detecting enlargement of the lymphatic glands, is often unreliable and misleading, and should never be substituted for explorative incision and its tangible results.

Fourth, and Final, Requirement—Recurrent manifestations of the disease should be met in the same prompt and thorough manner as the former ones, whenever practicable.

In my judgment, the adherence to the preceding demands will secure the best results possible from the art of surgery, both now and hereafter, so long as the disease is characterised by its present and past tendencies.

THE TENTH INTERNATIONAL MEDICAL CONGRESS AT BERLIN, AS I SAW IT.

By George Douglas, M. D., of Chenango County.

October 30, 1891.

One of the events which crowned the decennial year of 1890, and made it memorable, was the International Medical Congress, which convened in Berlin, Germany, August 4—the largest gathering of representatives of the medical profession the world has yet seen, and probably the largest the present generation will ever see.

The first gathering of the congress, on Monday, at 11 a. m., was in a grand amphitheatre called the Circus-Renz, resembling in shape the Coliseum at Rome,—seating upwards of eight thousand persons, but on that occasion every inch of standing-room occupied,—filled and crowded by at least ten thousand persons, among them army officials and representatives of the government in conspicuous dress, with imperial decorations and honourary badges of beautiful and striking designs, but mostly of delegates, not only from every country of Europe and from America, but from Asia, from Africa, from South America, from Australia, and from the islands of the sea—scientists and scholars from every portion of the globe, who had come there to submit to this world's tribunal the results of their truest thoughts and most patient labours.

The beautiful amphitheatre was draped with the flags of all nations, festooned with flowers, and made brilliant with flashing lights and amplitude of colours.

After the organisation of the congress, there was first the address of welcome and the reply, when came the able, most fit, and timely address of the president of the congress, the distinguished Virchow, the great teacher of cellular pathology, who, crowned with the knowledge of three quarters of

a century of research, honoured and almost idolised by his own countrymen, still survives in most remarkable grandeur of physical manhood.

After the address, there was presented before the large audience, from each of the principal nations there represented, *one* as the medical representative of such country—Sir James Paget, of London, the representative of England, and Surgeon-General John B. Hamilton, of our own country; but to Sir Edward Lister, of England, was accorded the most enthusiastic reception of them all, evidently indicating the unanimity of the profession in according to him very high and universal honour for his introduction of the antiseptic treatment in surgery, which has given to that branch of our profession such an increased percentage of success, and with it so much greater confidence and respect from mankind at large.

There were but three general sessions of the congress in this amphitheatre, most of the time being devoted to the reading of papers and to discussions in the sections of the congress, their place of meeting a very large and commodious building in the Austellung's park,—a famous place of resort with the pleasure-seeking Germans, with halls of entertainment, musical and theatrical, picture galleries, and beer gardens; and the surrounding buildings were utilised as places for the extensive exhibits of everything pertaining directly and indirectly to the profession,—not only instruments and appliances of every kind known to surgery, medicines and chemicals from the largest firms of almost every city in Europe, and also our own country, but systems of gymnastics, health-lifts, hygienic baths and hygienic beds, improved modes of ventilation, hygienic foods and drinks,—seemingly, all in all, an immense, world-wide collection.

This beautiful park was made approachable from almost every portion of the city by public tramways, and from the central part of the city by an elevated railroad, far more commodious, substantial, and magnificent in its structure than anything we can boast of in this country.

It was in these eighteen sections of the congress, embrac-

ing all the different departments of medicine and surgery, that the greatest interest was centered. The official languages used at all meetings were German, English, and French, but in discussions other languages were permitted, but reported by some one of the secretaries in one of the three official languages; and in this manner ten tongues and twice as many dialects were spoken in the course of the numerous discussions. Each of these sections was presided over by a president, also a vice-president, and usually not less than three secretaries reporting papers and discussions.

In the section of surgery, in which I registered myself, there were upwards of twelve hundred, and they held fifteen sessions in the course of the six days' time of the congress, which, with the social events of the occasion, filled about every moment of time during the eventful week.

I did not, however, strictly confine myself to this section, but went about at will to other sections, and especially where and when a paper was to be read by any one of the distinguished members or celebrities that I felt a special desire to see or hear; and it was to me the fulfilment of a much desired opportunity, and a lifetime event, to look upon such faces as Virchow, and Koch, and Pasteur, and Lister, and Esmarch, and Tait, and Billroth, and Oppingheim, Sir Spencer Wells, Sir James Paget, Apostoli, Barbour of Edinburgh, and a host of others,—where Canada and the United States met Brazil and the other states of South America; where Mexico met Russia; Great Britain met Italy; Spain met Japan; and Belgium, Holland, and Sweden met Asia and the islands of the sea; where France, only partially represented, but by the best and noblest of her sons, was most cordially greeted by Germany, and grew cheerful and fraternal; and where America, with her six hundred and fifty-seven delegates, was cordially met and greeted by all, and when the number was given at the first gathering in the Circus-Renz, the announcement was greeted with cheers long and loud.

In some of the sections complaint was made by certain delegates from our own country, England, and other repre-

sentatives not German, of a lack of courtesy and of proper recognition,—and perhaps with reason, for there was somewhat evident the same "animus" as possessed the little lad who said to his sympathising playmate, "*You* have no right to cry, for it is *my* grandma's funeral;" and the Germans appeared to some extent to consider it *their* congress, appropriate the front seats, and monopolise the time.

The Germans, as a nation, are fond of social festivities, and there was no lack of arrangements in this direction, although differing in some respects from the usual American style with *invited* guests. I was asked, on my return, if I did not find the Germans a very hospitable people. My answer was, "That depends much upon your definition of hospitality. If you call it hospitality for a friend to invite you to dine with him, and then he requires you to pay an equal share for the viands and the wines, *then* they are truly hospitable." The only free entertainment given was the first, on Monday evening, by the burgomaster, or mayor, of the city of Berlin, at the Rathaus or town hall, with no ladies present, the expenses of which were paid by a government appropriation by the Reichstag or parliament, at the recommendation of the German emperor, who also gave a court reception at his palace in Potsdam just before the close of the congress. At this reception the invitations were limited to four hundred, Germans mostly excluded, and the American delegates remembered, at least in a pro rata share.

Each section had their respective banquets, with speeches, toasts, etc.

In the surgical section, only seven hundred of the twelve hundred registered purchased tickets to the banquet, held in a large and beautiful hall of the Hotel Central, perhaps the most magnificent hotel in Berlin, and which was presided over by the royal court-surgeon, Von Bergmann, with Prince Carl Ludwig present, and at the tables Sir James Paget, Sir Joseph Lister, Von Esmarch, Billroth, Oppenheim, and, on the right of the president, in the place of honour, our representative, Dr. Billings, of Washington.

On the next evening several large balls were given in different parts of the city, and I attended the one given in the beautiful winter-garden of this same hotel, at which was present the princess of Germany (eldest sister of the present emperor), who led, with a prominent German official, the first dance of the evening, which was much after the order of the stately minuet of the olden time. After the dance, I had the opportunity of meeting her, and was most favourably impressed with her kindly as well as courtly air, her appearance of good sense, and her truly ladylike and considerate manners—a model and a pattern for many of the simpering, vanity snobs in our own country, who can boast of much more of money than of brains or intelligence.

The emperor did not return, as was expected, in time to be present at the court reception at Potsdam, and without his presence it lacked point and interest, and the palace itself is one of the least imposing of any of the royal palaces of Germany.

The farewell banquet and reception was given at Krolls Garden in the Royal Platz, when upwards of ten thousand were fed and wined, and supplied ad libitum with lager beer, in a way that was highly German and quite incomprehensible to an American.

The eighteen special sections of the congress were each made centres of special interest by the scientific papers read, containing the latest researches and investigations in these respective departments of medical science.

In the section of surgery, a very able paper was read by the distinguished surgeon Oppenheim, on the subject of brain surgery, describing the successful removal of a sarcomatous tumor from the brain; and Professor Glück, with a clinical patient, demonstrated the use of the articulated ivory pegs, in a case of excision of the knee-joint, introduced into the medulla of both bones, so as to give support and *motion* to the joint.

In the section of neurology, the subject of brain surgery, at the present time attracting so great attention in the pro-

fession, was extensively discussed, with a citation of many unusual cases. Victor Horsley, of London, led in the discussion upon cerebral haemorrhage; and, contrary to my preconceived ideas, it was decided that the ligature of the carotids was of no service in this class of cases.

In the section of obstetrics and gynaecology, Professor Barbour, of Edinburgh, read a very comprehensive and exhaustive paper on the stages of labour, with consideration of the after conditions and complications which most frequently attend this class of cases. In this section, Dr. Parvin, professor in Jefferson Medical College, Philadelphia, also read a masterly paper, listened to with much interest, on "Artificial Premature Labour," its indications and methods. A long discussion followed, in which many took part, and, in particular, the question canvassed as to which procedure was the most advisable in deformity of the pelvis, where premature delivery is demanded, whether by the Caesarian section at, or before, the full time (which had many advocates), or by enforced labour at the seventh month. The majority of opinion was, however, that the Caesarian mode was the most hazardous both to mother and child.

On the topic of uterine fibroids, or myomata, Dr. Apostoli, distinguished in galvanic treatment of diseases, read an able paper, advocating electrolysis instead of the curette and other surgical measures; and when advocating his most advanced and radical ideas, was hissed a little by the French, but applauded by all others. In the history of cases treated by electrolysis, as given by himself and others, there were certainly the most satisfactory results shown in this method of treatment.

Dr. Kaltenbach, of Halle, Germany, read a paper upon extirpation of the uterus, in which he cited eighty-two cases of total extirpation, by himself, for cancer and other diseases of this organ, with the loss of only two cases of death. After the reading of this paper, there was a very interesting and animated discussion, participated in by physicians from London, from Prague, by Pozzi, by Olshausen, by Landau, by

A. Martin, the first distinguished operator for extirpation of the uterus, by Czerny, and by a gynaecologist of national reputation, with an unpronounceable name, from Moscow and Russia.

In the section of state medicine and hygiene, Dr. J. Hutchinson, of London, gave a very able and thoroughly exhaustive lecture without notes on the noncontagiousness of leprosy, in which he took still more advanced and positive ideas than in his articles published in the early part of the year 1889, in the *British Medical Journal*, that leprosy is absolutely not contagious, but that it is by a special kind of poison taken into the system, in connection with food, that this loathsome disease is induced. A certain specific kind of bacterium has been found in the blood of all lepers, and this is found only in a certain species of fish; and it is by the eating of this kind of fish that the once healthy individual becomes a leper. This species of fish is found to be common in leprosy districts, and as the varieties of leprosy are the same the world over, in hot and cold countries alike, this fact would indicate that the cause must always be the same. In Norway, India, and the West Indies, nurses and surgeons do not fear to come in contact with lepers. So far as contagion is concerned, hundreds of surgeons daily encounter the same risks that Father Damien did; but he exposed himself to other dangers as well, partaking bountifully of all kinds of fish and food in use in that country of lepers.

In England, the most intimate possible contact with lepers has not been sufficient in itself to communicate the disease.

A striking illustration and proof of this is the instance of the colony of lepers from Norway that located in the northwest portion of Minnesota, not one of the wives or children being, or becoming, lepers.

These advanced ideas of Dr. Hutchinson were given more especially in the interests of humanity, and to prove how needless are the oppressive regulations, in almost all countries, making this unfortunate class outcasts, expelling them from society, and forbidding them to mingle with the rest of mankind.

Dr. French, of Brooklyn, led with an able paper in his specialty, the throat, and Dr. Horatio C. Wood's (of Philadelphia) address on "Anaesthetics" was a state paper, and was assigned a place of honour, that of the closing session.

I will not attempt to give you an idea of the subject-matter of all the papers heard, for that would be impossible, but every delegate will remember, so long as memory lasts, the scene when Koch stepped forward to read his "Researches," the ovation which he received most strongly disproving the old adage that "a prophet is without honour in his own country." Those salvos of applause were received by him with no look of gratified vanity;—though courteously acknowledged, it was with almost a perceptible manner of protest; and when the cheers had subsided and he had commenced the reading of his paper, his gentle yet decided bearing saying so plainly that he was giving the truth as he had found it,—his deep-set eyes so true and steady,—you could but accept his deductions and conclusions without a question.

Not being able to follow his paper, which was in German, I watched, with feelings akin to awe, the lines and shadows on the faces of those listeners, who, gathered there from the ends of civilisation, hung upon his words with breathless interest. I have many times seen men, large audiences, profoundly moved by passionate orations and stirring appeals from forum and pulpit, but never before had I seen an audience of intelligent, educated men listen with such intense interest as this audience to this man, who stood there striving to give to dying humanity a respite from a disease which, in all its varied, hydra-headed forms, has swept to an untimely grave far more than any other,—I had almost said, than all others.

In this medical congress, so largely represented from all civilised countries, while listening to the papers of these intellectual and professional giants, one could seem to divine that there was a pervading presentiment and belief that a great tidal wave in science was imminent, and that it centered on the discoveries of Koch. His name was upon almost every lip, his

researches the absorbing topic of the hour. Bacteria were in the air, and, in the many forms or names of bacilli, microbes, micrococci, were spoken of and speculated upon as the cause of almost every disease that flesh is heir to.

The prominence of this distinguished investigator and scientist will be my excuse for giving a brief history of the man.

Professor Robert Koch, as we are told, was the third of thirteen children, the first nine of whom were boys. He was noted as a studious lad, and early in life developed a fondness for the microscopical study of lichens and mosses, and when his mates and companions were out hunting and fishing, he was making such minute investigations his favourite pastime. He completed his course in the high school at Clausthal, Hanover, at the age of seventeen, but was unable, until he was eighteen, to enter the University of Göttingen, where he finished his studies. In his second year at this university, he wrote a thesis which won the first university prize.

We next hear of him as a physician at Wollstein, a Polish country town, in the district of Bomst, in the grand-duchy of Posen, and while there received the government appointment of district physician of Bomst. It was at this time that he made his researches and investigations, and performed his experiments, relating to anthrax and its characteristic bacillus, and in 1875 published his first work on anthrax, giving to the world the results of his discoveries and the aetiology of that destructive disease, and also published some treatises on wound infection.

In the summer of 1879 he was appointed to the position of medical expert in the law courts in connection with the university at Breslau; but this position was not satisfactory to him, neither scientifically nor pecuniarily, and he returned after a few months to Wollstein, where his place as district physician had been kept open for him. He was, however, soon after, in 1880, called to the newly founded Imperial Office of Health, in Berlin, where he has since been pursu-

ing his wonderful researches on the tubercle and cholera bacilli, which we earnestly hope and trust will ultimately prove of great advantage to science and to suffering humanity.

The distinguished Professor Ferdinand Cohn, of Breslau University, the famous botanist and scientist, says,—"When Koch came to my institute, on April 30, 1875, I can truly boast that in the first hour of our intercourse I recognised in him an unequalled master of scientific investigation. His method, his experiments, the classic clearness of his statements, were all as perfect in his first, as in all his later, researches." He further says,—"All Koch's works have been so complete in form and contents, that nothing remained for those that followed but to confirm them, for it was not possible to add anything essential."

But in this medical congress, notwithstanding that none doubted the sincerity of this new prophet, there were not wanting those possessed with a spirit of skepticism, which inclined them to mock at the arguments of Koch. Against Koch was Virchow, unwilling to abandon his long cherished biological doctrines, and Mr. Lawson Tait, the distinguished anatomist, surgeon, and controversialist, always vivacious, and somewhat reckless in manners, who facetiously, almost derisively, said, that if ever he got together enough bacteria to make a poultice, he would slap it on the next wound he had to dress. There were others, who, with greater candour and sincerity, willing to accept whatever might be truth, asked the question, "Have we yet struck the right trail?" and "Have we not been *too much* swayed by our hopes?"

Time, and still further investigations, can alone answer these questions; but let me assure you, gentlemen of the medical profession, this man is no charlatan, but an earnest seeker after truth. Look on his earnest face, his deep-set, truthful eyes, and you will not doubt that. By the ignorant and obtuse he is not understood, and, consequently, is misrepresented; by the envious, maligned; by many of the

conservative class, doubted; by the cynical class, sneered at; decried by the egotistical, who claim themselves to be the only fountains of knowledge;—but to the earnest seekers after truth, who believe there are more things in heaven and earth than have yet been found in philosophy and science, he will be accorded respectful attention and a candid hearing.

The superior effects of the treatment of many diseases by hypodermic injections are already very well known. For example, haemoptysis by injection of ergot, of syphilis by hypodermic injections of cyanid and bichlorid of mercury and chlorid of gold and sodium, the prompt effect of Samter's treatment of erysipelas by carbolic injections, and the use of strychnia and quinia in typhoid conditions. The experience of Tyndale, in New York, in the vaccination process for the cure of tuberculosis, promises favourable results; and Dr. Landever has obtained beneficial effects in phthisis from hypodermic injection of balsam of Peru, which, he says, goes at once to the diseased part, thus stimulating the animal fluids. That certain chemicals have a selective action on tissues, cannot be doubted,—as, *e. g.*, the hypodermic injection of cantharidin resulting in the production of inflammation of the air passages; arecoline, a volatile liquid alkaloid from the areca nut, has a selective action on the heart; digitalis, upon the cells and vascular system. This would seem to show that there must be a sort of antagonism or isomerism between animal and chemical vegetable poisons, and why may not more universal application be made of this principle, with a view of obtaining more therapeutic agents and effects?

The great hopes and expectations, formed at the first publication of the methods and discoveries of Dr. Koch, have resulted in decided disappointment; but the most recent statistics, obtained by the German government from fifty-five hospitals, would indicate that the reaction that has set in against his treatment is beyond what facts would justify, considering the utter hopelessness of this class of diseases as treated by other and former methods. These statistics show

that while less than 13 per cent. of cases of internal tuberculosis were cured, 30 per cent. were improved, leaving only a little less than 60 per cent. of unimproved and fatal cases. Of cases of external tuberculosis, about 15 per cent. were cured, upwards of 40 per cent. improved, leaving less than 50 per cent. of fatal and unimproved cases in this, as it would seem, more curable form of tubercular diseases.

Koch himself, while believing that his remedy, "tuberculin," is a cure for incipient tuberculosis of the lung, does not claim there is yet established the fact of its being a permanent cure, and fears that in advanced tuberculosis its use will prove no more than beneficial. The first marked change by its use in tubercular lung affection is, that the expectoration becomes non-purulent, and this change greatly retards the rapid wasting of strength and vitality, so marked in advanced tuberculosis of the lung.

Thus far, the most striking and rapid cures have been effected by its use in lupus, where recovery has repeatedly followed a single injection.

The investigations of Robert Koch have unquestionably opened up the way to discoveries in new and valuable ways of diagnosis and treatment of diseases where microbes play an important part in the inception and progress of disease, and out of it may finally come more certain and effective measures, prophylactic and curative. It was from Robert Koch that the illustrious Pasteur obtained his idea of his present treatment of hydrophobia, from a demonstration made by Koch, in King's College, London, of his then new method of cultivating microbes, during the International Medical Congress in that city in 1881. It is in the same line of investigation, discovery, and treatment as that by which the immortal Jenner gave to the world the methods of restraining and preventing what was, less than a century ago, one of the most dreaded and terrible of the diseases that scourged the human race, and gave to the physician that almost omnipotent power by which he can lay his hand on that loathsome disease—the small-pox—and say to it, "Thus far shalt thou

go and no farther, and here and now shall thy devastating progress be stayed."

If this can be done by tuberculosis, in all its manifold forms and complications, what a boon it will be to poor, suffering humanity, and how well worthy our greatest efforts, our most diligent and patient study and research! In my heart are no cynical sneers, no ridicule or contempt, for Koch, or for any other earnest worker in all and every rational method which may tend to mitigate and limit disease and suffering. Consumption, in its comprehensive signification, as generally used, classes among its victims more of those who are refined by nature, beautiful in person, intellectual, brilliant, and attractive in social life, than any other, perhaps all other, diseases.

How often do we see, of the weaker sex (I mean physically, not mentally), those whose beauty and loveliness make even their very presence a benediction and a blessing, long before life has reached its meridian, fade away from family and friends, leaving hearts and homes sorrowing and desolate, some going in the morning of life, and seeming only like beautiful visions sent for a little time to cheer and bless us, and then taken from us. How well do I remember one such, who for five brief years was the light and joy of a happy home, filling its very walls with sunshine and music, but who, after only eight weeks of what is not inaptly termed, in common parlance, "galloping consumption," immediately following the birth of her first-born child, one morning in the early spring-time, just as the sun was breaking over the eastern hills, folded the white hands across the peaceful breast, which soon ceased its throbbing, bade me farewell, and then the gentle, loving spirit went away.

The fragrant and beautiful rose that blooms under our window or in our garden, gladdening our senses with its sweet perfume, our eyes with its exquisitely blended colours, sometimes fades prematurely, some untimely blight causes its lovely petals to droop and fall, and our hearts sadden with disappointment at the sight of the destruction of what

we had thought would cheer us for many a long summer's day; but we have consolation in the thought that at another spring-time it will bloom again. But when disease and death come into our homes and take from us the loved and cherished ones, we *know* that no coming spring-time will ever bring them back to us. We bury them out of our sight, and so much of the light and joy of our life has gone out forever.

God grant that the day may not be far distant when *this* class of diseases, which have so long been the *onus probandi* of medicine, shall, by investigation and research, be made as curable and controllable in the hands of our profession as the once dreaded small-pox, that marred and decimated the human race.

And with this desire in my heart, this prayer on my lips, and thanking you much for your kind attention, I bring to a close this poor attempt at portraying to you, "as I saw it," the Tenth International Medical Congress at Berlin.

CONGENITAL IMPERFORATE RECTUM.

By E. D. Ferguson, M. D., of Rensselaer County.

October 30, 1891.

During my vacation in August, 1890, and when in town for a portion of a day, I was requested by Dr. A. T. Van Vranken to see an infant with an imperforate rectum. I hesitated to undertake the visit, as the time intervening until the train I was to take—the last one for the day—was quite short for the visit itself, aside from the possible delays connected with operative work; but as the doctor was kindly urgent, I ventured into the case.

The patient was a day old, and had an anus well formed in every particular, but the gut terminated, just beyond the internal sphincter, in a cul de sac. The impression imparted to the examining finger was such that it was concluded that the lower extremity of the imperforate gut was distended with meconium, and that a communication could be established, with the probability of securing a moderate sized outlet for the intestinal contents, with a very moderate immediate risk to the patient.

As the family were anxious for an operation to correct the malformation, no further time was consumed in preliminaries than was necessary for the disinfection of the hands and appliances.

In selecting the point for and direction of the puncture, it was aimed to enter the knife, a sharp pointed tenotome, at the centre of the upper extremity of the lower segment, and to carry the point thence in the direction of what seemed to be the nearest point of the upper segment. In making this calculation the operator endeavoured to keep in mind the shape and dimensions of the infantile pelvis, in order to avoid

contiguous structures; and the necessity for this care was emphasised by his knowledge of a case in which injury had been inflicted on some of the pelvic nerves, thereby causing a permanent paralysis of some of the leg muscles, though the case was in other respects fairly successful.

A bivalve ear speculum was used to give access to the upper extremity of the lower segment, and after the knife had penetrated about one quarter of an inch, a loss of the feeling of resistance showed that a cavity had been reached, and a slight sawing motion gave sufficient space by the side of the blade to permit the escape of a minute portion of meconium. A small probe, bent at nearly a right angle near its extremity, was then introduced, and it was determined that the opening could be slightly extended in any direction. A nick was then made at each quarter, a uterine dilator introduced, and the opening stretched and lacerated so as to admit my index finger. This was attended by the escape of a large amount of meconium. The sensation to the entering finger was such as to give good ground for the conclusion that neither the incision nor the dilatation had made an opening into the lateral walls of either portion of the gut.

As ample space had been secured for infantile defaecation, it was decided to treat the case by daily dilatation, but the family were informed that it might be necessary to exsect the strictured portion and stitch the rectum to the anus.

No accidents occurred in the future management of the case. After a few days the strictured part was somewhat forcibly dilated to a moderate extent, and soft rubber rectal bougies were used daily, at first by Dr. Van Vranken, and finally by the mother. The child is now nearly fifteen months old, and it suffers no inconvenience, and the rectum receives a bougie of the size of a large thumb, and there is apparently a disposition on the part of the tissues to allow of a proper increase in the calibre of the bougie to correspond with the growth of the child.

Though imperforate anus or rectum is comparatively infrequent—it being estimated by different authorities as

occurring once in from 5,000 to 20,000 births—still, the fact that it requires prompt treatment makes it of interest.

In this case credit is due to the attending physician for the early discovery of the malformation, for the presence of a normal anus has frequently given rise to the diagnosis of "wind colic," until a greatly distended belly would lead to a more thorough investigation, though peritonitis or exhaustion would then generally preclude an expectation of successful interference.

This case may serve as a text for some remarks on the general subject of imperforate rectum and imperforate anus, but the consideration will be limited to congenital occlusion of the canal, and will not include other malformations in that region.

The recto-anal canal is developed from two sources. The mesenteron or main portion of the intestinal canal is developed from the hypo blast, though the outer coats are derived from the mesoblast.

The anus and sphincter portion of the rectum is developed from the epiblast, and is first noticed as a slight pit in the skin of the perinaeum. It is the advancement downwards of the mesenteron from above, and the extension upwards of the anal pit entitled the proctodaeum, until they unite and form a continuous tube that explains the formation of the lower bowel. This conception renders the causation of malformation of the rectum and anus clearer, for a failure to develop or a "failure to connect" will usually explain an occlusion rather than adhesion, after a pervious canal has been created.

A "failure to connect" may be due to a lack of development of either or both the mesenteron and proctodaeum, whereby the lower extremity of the rectal pouch remains more or less removed from the perinaeal region; or the proctodaeum fails to form, or, having formed, fails to advance to its proper and predestined alliance. On the other hand, both may advance a sufficient distance, but by being "side-tracked" may fail to unite. A striking instance of this *switching* in embryological development is shown by the case

of Amussat, and rendered famous as the one in which he first performed the operation to be referred to later. The rectal pouch advanced steadily, but, failing to reach the anal pouch, it stopped near the extremity of the coccyx. The anal pouch in some way was directed forward, and, being possessed apparently with a necessity to unite with some other canal, it opened into the vagina at its upper and posterior portion.

In addition to the foregoing methods, it seems probable that after the indentation for the proctodaeum has appeared it may be bridged over at the level of the skin by an exuberative, formative tendency at the marginal portions of the cutaneous tissues, or the proctodaeum may develop from the deeper portions of the skin. At least these methods seem the most logical explanation of those instances in which the sphincters are well developed but a thin diaphragm occupies the anus.

From the foregoing considerations it is apparent that there may be several varieties in congenital occlusion of the recto-anal canal, and the following classification of cases may be made for the purposes of this paper:

First. Simple occlusion at the anus by a membrane or true skin.

Second. Absence of the anus, the rectum terminating in a blind pouch or series of pouches, more or less remote from the perinaeum.

Third. The proctodaeum is formed, but fails to connect with the rectum, which terminates in a blind pouch or series of pouches, more or less remote from it.

Fourth. Entire absence of both anus and rectum.

The management of cases of the first class, *i. e.*, where there is simple occlusion of the anus by a membrane or the integument, is quite satisfactory, all that is necessary being to make a crucial incision, and, if thought best, to snip off the tabs thus formed. A moderate care to dilate occasionally during the process of healing will effect a complete cure.

In the other cases the affair is quite different, and requires interference of more difficulty and gravity.

In the second class, where there is absence of the anus, it is desirable to form an opinion as to the distance from the perinaeum at which the rectum terminates; but, as desirable as this knowledge may be, it is not probable that it can be ascertained, except in cases where the intervening tissue is less than one half inch, and even that distance may prevent a bulging during straining on the part of the infant or downward pressure at the pelvic brim by the surgeon. It does not seem probable that much value can be attached to percussion over the perinaeum or sacrum, as has been recommended, for aside from the limited area, which would manifestly diminish the value of the measure, it is quite probable that the lower extremity of the gut will be occupied with meconium, and so fail to furnish resonance, though actually present in the pelvis.

In cases of the class now under consideration, there is room for a choice of procedures. Nothing may be done, and the infant allowed to perish,—and, in view of the uncertainty of securing an outlet which will be an efficient substitute for the normal canal, we will find some instances in which the parents will prefer that course; but the fact that temporary success is quite common, and that even in very difficult and unpromising cases results have been secured that allowed of prolonged, comfortable, and useful life, should decide us in advising that a trial be made.

Having decided to operate, what shall the operation be? If there is evidence that the bowel can be reached from the perinaeum, it is manifestly our duty to make the incision there. If, however, there is no basis for a conclusion as to where the bowel terminates, shall we proceed at once, according to Littré, and make an artificial anus in the lumbar region (or in the groin or hypogastrium)? My own judgment in such cases, and I believe it is the advice of the majority of authors, is, to first make a reasonable effort to reach the bowel from the perinaeum, and, failing in that, do an inguinal or hypogastric colotomy. In making what may be considered a reasonable effort to reach the bowel from the

perinaeum, it is to be borne in mind that the distance between the tuberosities of the ischii, from the coccyx to the pubes, and from the coccyx to the promontory of the sacrum in these little patients, is in each of the foregoing lines only a fraction over an inch. We must remember, also, that the rectum lies close to the sacrum, and that it is desirable to avoid injury to that bone, though to touch it with the knife at the median line would not be as serious as at the lateral parts.

Having the patient in the lithotomy position, the skin is incised in the median line from just back of the scrotum or fourchette to the coccyx, and if after this incision, and a few strokes of the knife, admitting the finger to the depth of one half inch, the gut cannot be felt, it would be well then to follow the advice of Amussat, and excise the coccyx.

There are two reasons in support of this excision. In the first place, it will give us a slight advance up the pelvic cavity, thus making the operating-field more extended, and, in addition, in case we find the bowel, it will, by the distance thus gained, shorten the interval through which the bowel must be drawn to be stitched to the skin. With care we may now separate the pelvic tissues, and, taking the anterior surface of the sacrum as a guide, advance an inch, or even an inch and a quarter. It is probable that to exceed the distances just noted would make the operation much more hazardous than colotomy, though the writer in one instance extended the search to the extent of one and one half inches without inflicting serious harm to contiguous organs, but in that case it was understood at the commencement of the operation that colotomy should not be done under any circumstances.

In this trial, let us assume that we finally reach the bowel. It should be sufficiently separated from surrounding tissues to allow of being opened and drawn downwards; but we must not forget that its anterior surface is usually covered with peritonaeum. It is not probable that the presence of the meconium in the wound will interfere with the process of repair, except as a foreign substance, for it is presumably aseptic. As soon as the meconium has been sufficiently

evacuated, the rectum should be drawn towards the posterior extremity of the incision in the perinaeum, and, after thoroughly cleansing the parts, should be united to the skin by stitches of sufficient depth and closeness to secure it in its new position. If the tension is considerable, the first stitches may be made to include the skin so as to invaginate it, and thereby lessen the strain on the gut, and the later stitches may secure the invaginated skin to the deeper parts. In some of these cases a certain amount of sphincter action is said to arise from the perinaeal muscles, and in Amussat's case, previously referred to, the rectum was brought to the surface at the coccygeal region, the child recovered, grew to womanhood, married, and bore children, and, in fact, suffered very little inconvenience as the result of the deformity.

In case we fail to find the rectum after what seems to be a reasonable search, it is manifestly our duty to do a colotomy, and I presume the left groin, or the linea alba, a short distance above the pubes, would be selected, according to circumstances or the ideas of the operator; but the description of such a procedure does not fall within the scope of this paper.

If the success in the perinaeal operation has been such as to secure healing without sloughing and retraction, it is probable that little after-treatment will be needed, though the rectal bougie may be indicated; but if the rectum could not be well drawn down, or if it retracted during healing, then a contraction of the canal will begin, and in many cases will continue until the passage will be too narrow for the escape of any but liquid faeces.

In such cases a colotomy will be required, and it is gratifying to know that an artificial anus is not necessarily as troublesome as would appear at first thought. There are instances where the subjects have been able to go into society without their infirmity being suspected, and one case is known where the patient not only undertook extensive and varied social duties, but married, and bore a family.

Our third class, in which the anus is developed, but fails to unite with the rectum, offers quite a variety of cases; but

in all the effort will naturally be made to reach the rectum through the intervening issues, and should the closure be of a diaphragmatic character, with the abutment so square as to give a fair chance to secure a good opening without injury to the peritonaeum or general pelvic connective tissue, then incision of a crucial form, with or without immediate dilatation, should be practised, as in the case related. This will secure present relief, and a further operation can be done later, if circumstances require it, to bring the rectum to the anus, after dissecting out the intervening ring.

Should there be any doubt as to the distance through the intervening tissues, the proctodaeum should be incised backwards to the coccyx, which may also be excised, as formerly suggested. In these cases the operator will exercise his individual judgment as to how far he can utilise the proctodaeum in establishing the new canal, should he be fortunate enough to reach the rectum; but on general principles an effort should be made to utilise it, and it is probable that, as a rule, it can be done, though it will be desirable to unite the posterior edge of the rectum to the skin in the coccygeal region, and then adapt the rectum to the skin and proctodaeum, as each case may indicate.

It has been held, even in cases where the obstruction is diaphragmatic, that it will be necessary to bring the rectum down after exsection of the parts involved in the obstruction; but practical observations have shown that there are exceptions to that rule, and we trust that the case related will prove to be one of the exceptions, though it were doubtless well to be guarded in making promises as to permanency of results.

The fourth variety in our classification, in which there is no anus and no rectum, the bowel terminating in the vicinity of the sigmoid flexure, offers no chance for relief aside from colotomy; but as the absence of the rectum cannot be known before operation, it will be proper to begin work at the perinaeum, as indicated in considering the second variety, and, after failing to find the gut there, we can do the high operation.

BRIEF COMMENTS ON THE MATERIA MEDICA, PHARMACY, AND THERAPEUTICS OF THE YEAR ENDING OCTOBER 1, 1891, ALPHABETICALLY ARRANGED.

By E. H. Squibb, M. D., of Kings County.

Read by title October 30, 1891.

In the following brief commentary, the aim has been to give a short, compact digest of the prominent current literature of the professions of pharmacy and medicine. There has been no attempt at treating the subject exhaustively, in the way of noticing everything that has been spoken of in relation to these allied topics; but an effort has been made to sift the great accumulation of matter presented during the year, and give what may be of some little service to those seeking for general information as to how matters are progressing in the line in which a busy practitioner is supposed to be interested, and yet is unable to give the time to even hurriedly skim over the literature.

The alphabetical arrangement is intended, of course, to aid in easy reference to any individual article as it comes up from time to time.

Abstracts were introduced into the U. S. Pharmacopoeia of 1880 with a considerable expectation that a need was felt by the medical and pharmaceutical professions for just such a class of preparations. Up to this time the need has not been evident, and it might be well to consider the advisability of striking them from our official list.

Acacia, or true gum Arabic, is becoming less and less every year, and it is now being both adulterated and substituted by gum Senegal—an inferior grade. It is worthy of note that just at this time, and doubtless due to the scarcity of the true gum, close investigations are being made of wattle gum, obtained from several species of the Australian acacia. We may, therefore, probably look to this quarter to at least partially supply the deficiency.

Acetanilid (antifebrin) has lost much of late of its vaunted reputation on account of its impurity. Toxic effects have been unexpectedly produced from even fairly moderate doses, although prescribers seem to differ very considerably in what they consider the proper dose. Its apparently marked antipyretic properties, with which it started out, are less relied upon than formerly. Its good effects are to be found in its analgesic and hypnotic action. Its results have been harmful in some cases of typhoid fever, especially in pregnant and nursing women. Good results are to be looked for in neurotic affections, such as lumbago, neuralgias, severe rheumatic pains, sciatica, and the like. However, it appears to be safe and useful as a hypnotic in children, especially when affected with bronchitis or croupous pneumonia. Its comparative insolubility, and thus tastelessness, together with the smallness of dose, recommend it strongly in these cases. It may be well administered by placing the drug itself, or mixed with a little sugar, well back on the tongue, rather than attempt to improvise some mixture. Notwithstanding conflicting results, this article has come to stay, and has recently been added to the British Pharmacopoeia. No doubt the revisors of our own Pharmacopoeia now at work will also give it attention.

Acid Agaricic is a new resin-acid, which has not made much of a reputation yet. It is obtained from the fungus *Polyporus officinalis* growing on larch trees, and is seen in small white crystals. It has been used with some effect in phthisis for checking the night-sweats while diminishing the thirst and excretion of urine. It is somewhat cathartic in its action, but tends to lessen vomiting and purging. It is only slightly soluble in water.

Acid Camphoric is the product of the oxidation of camphor by boiling with nitric acid, and occurs in small, white, odourless crystals. It is insoluble in water, but readily soluble in alcohol. It is absolutely tasteless, and free from that burning sensation so characteristic of camphor. It was first used by Reichert, in 1888, in acute and chronic affections of the respiratory organs, in angina, coryza, and the like. Afterwards Fürbringer used 2 per cent. injections in cystitis, and recommended it against the night-sweats of consumptives. This latter recommendation was put in practice with markedly beneficial results. Schultze has met with good results, and suggests the use of antipyrine in the usual quantity in conjunction with the acid, to counteract the diaphoresis. Combemale has also published his gratifying results. Dr. Hare, of Philadelphia, now most heartily endorses Combemale's good results, as he had used it in ten consecutive cases with great satisfaction. It surely deserves more extended trial, not only in the night-sweats of phthisis, but in the profuse sweating from other causes.

Acid Carbolic is still subject to the same reddening that has occurred in past years; and although emphasis has been laid on the fact that the

reddening has not altered its medicinal efficiency, still the white crystals are sought after by preference, and some even go so far as to refuse the coloured as unfit for use. The recent production of the synthetic acid has not helped the matter, as it also is subject to the same change. This latter observation more than any other led observers to look for the cause as being extrinsic rather than intrinsic. E. Fabini conducted a series of careful experiments to this end, and now believes he has discovered that the reddening is due to contact with copper vessels, while the acid has combined with ammonium. We have long recognised the reddening effect which ammonia vapours would produce, but had not suspected that a metal was necessary as well at the same time. Fabini's deductions are not necessarily conclusive, but they are interesting and instructive as being a step in advance.

The remedy suggested—to avoid contact with metals from beginning to end—would have rather a prohibitive restriction to its manufacture, if it is desired to produce it at a reasonable figure for general use.

Chromic Acid has been much improved in quality and uniformity, and no doubt there will now be no trouble in getting it regularly of the fine quality we now see it. This is all of foreign manufacture, and surpasses anything ever produced here. The chief objection in times gone by was the lack of care in washing it free from sulphuric acid. When the surgeon is looking for the caustic effect of this acid, he does not desire to see that of sulphuric acid developed as well.

Acid Cresotic, as used in medicine, is strictly the *para*cresotic acid, for there are three modifications,—the *ortho*, the *meta*, and the *para* acid. Mr. H. Helbing, of England, has recently shown very clearly that this acid bears the same relation to cresol that salicylic acid does to phenol, and it is prepared in the very same way that Kolbe prepared salicylic acid synthetically. The sodium salt is the one usually used in medicine, and is called in full *paracresotate of sodium.* The doses and uses are the same as those of salicylate of sodium. The results claimed for it are better than those obtained with salicylate of sodium, but it has been little used in this country as yet. In England it has been in use for some time, and Prof. T. R. Fraser, of Edinburgh, has an accumulation of cases giving very encouraging results, which he proposes to publish shortly.

Acid Hydrocyanic Diluted, as prepared by the official process, is still prone to early decomposition. Many experiments have been repeated to remedy this defect, without improvement. Preservatives have been added, and various solvents have been used to hold the gas, but nothing has succeeded any better than distilled water. Extra precautions in the manufacture and in observing cleanliness in the retaining packages give moderately good results, but nothing very definite has been accomplished yet.

Acid Oxynaphthoic is of recent introduction into medicine. It is a naphthol product, prepared in a roundabout way, which is not of moment here. It occurs as a white powder, devoid of odour, and therefore will be in this respect a strong rival of iodoform, as their uses are alike. It has been used in several skin affections with gratifying results. It is said to be five times stronger than salycylic acid in its antiseptic effects. It is not used internally, but has been employed in solutions of 1 to 100 with phosphate of sodium for vaginal injection. Meagre reports only are yet at hand.

Acid Salicylic, as made artificially, has during the passed year undergone a considerable amount of investigation and discussion, principally in Great Britain. It has long been noticed that at times a marked depressing effect followed its administration, and to determine the cause has been the reason for critical examination. The pharmaceutical chemists are apparently at variance on the matter, as the cause had been stated by some to be cresotic acid, and particularly paracresotic acid. This conclusion has been received very skeptically in many quarters since the paracresotate of sodium has been used medicinally with such gratifying results in cases where salicylate of sodium had previously been used unsuccessfully. However this may be, some foreign substance evidently does exist in the English acid which it is aimed to avoid, and investigations are still in progress. Practically all that is used in this country is of German make. Although there are several grades of this acid sold by the Germans, still the grade that is sent here is for the most part the best, and we get very little of the bad effects which our English brethren notice.

Acid Salicyl-sulphonic (sulpho-salicylic acid) has again been brought to notice as a test for albumen, although it has been known since 1889, when G. Roch first called attention to it. Dr. John A. Macwilliam, of the University of Aberdeen, elaborates the subject in a manner which invites attention.[1] This acid is obtained by the action of sulphuric anhydride on salicylic acid, or by heating salicylic acid with strong sulphuric acid, and occurs as colourless, needle-like crystals, freely soluble in water.

Acid Trichloracetic offers us another agent for detecting albumen in urine. It is one of the newer tests, which bids fair to remain with us. It has been used considerably since it was first brought forward, and with success. Insurance examiners are the loudest in praising it. It may be used in the form of a saturated solution, or a crystal of the acid may be dropped in the suspected urine. The turbid line, which forms immediately at the junction of the liquids, is to be distinguished from that formed by urates by the rapidity of formation of the former.

This acid has also been found effectual as a caustic and astringent. In throat and nose affections its effect is much more local than some of the other caustics. It is readily soluble in water, and deliquesces easily.

[1] Brit. Med. Jour., April 18, 1891, page 837.

Out of 140 cases treated by one practitioner, 87 needed but one application. Dr. J. W. Gleitzmann of this Association has met with very favourable results, and summarises as follows: "1. Trichloracetic acid compares favourably with other caustics in hypertrophic conditions of the throat and nose, and is a valuable addition to the remedies now in use. 2. In the greatest majority of cases it is sufficient to produce the desired reduction of tissue, although it does not supersede the galvanocautery. 3. It can be applied with safety to the larynx without any evil consequences. 4. Its chief advantage in nasal affections is the dryness of its eschar, which prevents unpleasant sequelae, and makes after-treatment unnecessary."[1]

Alkaloids are now a class of preparations greatly on the increase. Physicians continue to demand of the manufacturer that his medicaments be condensed into the smallest space, and offered in the most convenient and accurate form for dosing. This has led the manufacturer to attempt to isolate every active principle possible, and discard the old-fashioned preparations. It is now coming to pass that physicians are not obtaining the results they looked for in many cases of the apparently isolated alkaloids, because they have expected the same effects from these that they used to get from the officinal preparations of the drugs themselves. It is time, then, to call attention again to the oft repeated fact that the individual effects of such alkaloids must alone be looked for, and not the general effects of the drugs, which latter, in many cases, are the ones expected. Again, the alkaloids apparently isolated are at times suspected of being either wholly or partly the product of the chemical treatment, and may not necessarily exist as such in the drugs beforehand. The accuracy of our chemical knowledge, especially in regard to organic chemistry, is not by any means definite enough for us to state positively that the final result of our chemical treatment of a drug existed there before our manipulation. Thus it follows that the therapeutic effect of the apparently isolated alkaloid may be quite different from its effect in the initial preparation of the drug just previous to our manipulation of it.

Amylene Hydrate (tertiary amyl alcohol) is a colourless, oily liquid of a camphor-peppermint odour, prepared by the action of diluted sulphuric acid on amylene, and distilled. It was introduced some years ago as a hypnotic, and was then found to be safe, and superior to paraldehyde, as it produced no disagreeable after-effects. It is not, however, equal therapeutically to chloral. It is found now to be not only hypnotic, but anodyne, in its effects in some cases. It apparently does not disturb the respiration or heart's action. It appears to act successfully in cases of nervous sleeplessness, especially in children suffering from whooping-cough. Epilepsy has been well treated with it; and if it appears to be

[1] Med. Record, vol. 39, page 312.

too weak in its action, a little morphia added in conjunction improves its beneficial effects. It deserves further trial.

Anaesthesin was exhibited at the last International Medical Congress in Berlin, synthetically prepared. Messrs. Gehe & Co. since then claim this to be bromacetanilid. It was a white, crystalline powder offered as a rival to cocaine in local anaethesia. Little has been heard from it or about it since that time, and therefore we have little professional interest in it as yet.

Antikamnia, the new "analgesic, antipyretic, and anodyne" which was so suddenly and attractively thrust upon us, proves now, upon careful analysis, to be nothing more than a mechanical mixture of acetanilid and commercial bicarbonate of sodium rubbed up into a fine powder. Its therapeutic effects have been good, but only to the same extent as acetanilid itself, with the noticeable advantage, however, of acting more quickly and in smaller doses, due no doubt to the presence of the bicarbonate of sodium. Under the above circumstances, then, it would be far better to extemporise a prescription of about 75 per cent. of acetanilid, and pay about one tenth the price the leading firm exacts.

Antinervin was introduced into medicine a couple of years ago as being analytically salicylbromanilid, and similar in its effects to acetanilid, with its accompanying disadvantages. Its recommended efficiency in diabetes has not been verified, and we hear little of it professionally. It may be of interest, however, to learn that, from a careful examination, it is now concluded to consist of a mixture of 50 parts acetanilid, 25 parts salicylic acid, and 25 parts of bromide of ammonium.

Antipyrin has lost very little of its popularity during the past year, but the profession has been gradually learning to use it with caution. Several very trying poisonous cases, with some deaths, have occurred from its use, even after moderate doses; but many undoubtedly were not entirely due to the antipyrin. It has surely come to be considered now as one of our useful therapeutic agents, and it has been recently added to the British Pharmacopoeia under the name Phenazonum (Phenazone). It is becoming more and more recognised as an analgesic, and its antipyretic properties are rather confined, in the hands of careful observers, to cases of hyperpyrexia. Its marked advantage over many of its rivals is its ready solubility. The profession appears still to be divided as to whether its best effects are produced from small repeated doses, or from large infrequent ones. Some lately have claimed that it is almost a specific in puerperal fever. Its successful use as an antigalactic is markedly on the increase, and care is constantly recommended in administering it to nursing women. It has quite a reputation at the present time in whooping-cough and incontinence of urine in children. M. Gundez treated 37 cases of incontinence, with 19 cures and only 3 complete failures. M. Périer emphasises—what many others have noted—its decided beneficial

effects as a haemostatic in minor surgical operations. The dermatologists have sounded its praises, both in this and the old country. Blaschko read a paper before the Berlin Dermatological Society, stating that he believed the most marked results were obtained in those skin affections accompanied by pruritus. Much attention has been given within the past year to its use in diabetes mellitus, and quite an array of statistics are now available, both in our own country and abroad. The French, in particular, give very favourable opinions of this use of it in such selected cases where polyuria is prominent and in elderly persons. Its principal abuse is met with in its general popular use for headaches and minor ailments. Very little attention is paid by the laity to the direct cause of a headache. The immediate attention is given to getting rid of the pain, rather than to seeking the cause in some form of indigestion or other minor indiscretion, and applying a rational treatment of the economy as a remedy in place of medication.

Antipyrin has shown itself capable of combining with other substances to form new products for which investigators claim therapeutic value—forming hypnal, salipyrin, resopyrin, and others formed with the phenols. M. Patein, of the Paris Society of Pharmacy, maintains, however, that these new compounds can rationally have no therapeutic value as compounds, on account of their immediate decomposition upon contact with the digestive secretions.

The use recently of the double valerianate of antipyrin and quinine in neuralgia has given considerable satisfaction.

Antiseptol (cinchonine iodosulphate) represents one of the various recent attempts to obtain an efficient substitute for iodoform without the objectionable features of the latter. It is odourless, and is made by the addition of a solution of iodine and iodide of potassium to sulphate of cinchonine. Its use is largely confined to continental Europe, and little is heard of it as yet in Great Britain or in this country.

Aristol is one of the new antiseptics brought forth as a substitute for iodoform. It is a reddish-brown powder obtained by treating a strongly alkaline solution of thymol with iodine. It gradually becomes paler in colour, due to the iodine given off from exposure to sunlight and to heat. It therefore should be kept from an undue amount of light or heat. It has the disadvantage in some respects of being insoluble in water. Owing to its unstable nature, the excipients which may be employed are limited. It is used mostly in the powdered form, but its use with olive oil, collodion, and the ointments in general is rapidly on the increase. For the two previous years it has been mostly known by the name of "annidalin," but recently, and since the inauguration of new modes of preparation, it has been urged forward with renewed vigour under its present name.

From recent investigation it appears that its efficiency is largely due

to its instability, and any attempt to render it free from its property of slowly giving off iodine renders it comparatively inert. It has been suggested that this very fact may account for some of the failures which have been reported by some investigators.

Aristol at the present time has a very universal testimony as to its usefulness in medicine. Some go so far as to claim that it is one of the most important additions to our materia medica in recent years. Its antiseptic power is very pronounced. It has a slight, but not unpleasant, odour. When dusted on open wounds or ulcers it is not irritant, and promotes rapid cicatrisation. It has no toxic effects, as iodine cannot be found in the urine after using in any of its forms of application. It is, therefore, a safe remedy to leave in the hands of the patient, as experience has now proved. None of the iodoform substitutes have as large a proportion of iodine as iodoform itself, aristol having less than one half. It has now been employed wherever iodoform had been, and with very gratifying results almost universally. In some quarters discouraging results have been obtained in syphilis, but better ones in venereal ulcers, the complaint being its slowness of action and its inferiority to iodoform in therapeutic activity. Good results are reported on all sides in diseases of women, particularly in endometritis, cervical erosions, vulvar eczema, and cancer of the cervix—acting as a most effective disinfectant and deodoriser. From continental practitioners come good results in several cases of ozaena, giving in one case better satisfaction than iodoform just previously tried. In naso-pharyngeal catarrhs in combination with petrolatum it has been sprayed on the affected parts with good effect. In psoriasis it seems in general to give satisfaction, but is not so prompt in action as chrysarobin. Its other advantages, however, make it a formidable rival. Dentists have now found use for it in the treatment of ulcerations and in disinfecting cavities. It noticeably arrests pus formation. The fine powder has been dusted on the vesicles in poisoning by poison oak, giving much relief, and reducing the burning and swelling of the parts. No record is yet found of its having been used in preventing the ulceration and pitting of variola.

Benzoyl Eugenol (benzeugenol) is a new product without any history in a therapeutical way; but if expectations are realised, it aims to be a valuable remedy in tuberculosis. It is made by a patented process from the union of the principal constituent of oil of cloves, called eugenol, with benzoyl. Oil of cloves itself has been used in the treatment of this affection before, and Dr. Koch has suggested the internal administration of eugenol in tuberculous patients. Investigators in Berlin then took up the production of this compound. It is seen in colourless and odourless needle-like crystals, of slightly bitter taste, practically insoluble in water. Nothing at all has been heard of it medicinally in this country, and the accounts from the old country are still very meagre.

Betol (salinaphthol) is a compound of salicylic acid and naphthol, very similar to salol, and applicable to the same uses. It was expected theoretically that this new compound would be superior in action to salol; but clinical experience has not been generally favourable, although good results are reported from its use so far as an intestinal antiseptic. It comes as small, colourless and odourless broken crystals insoluble in water. Its taste is not disagreeable, and its toxic effects are not noticeable in moderate doses. It is, therefore, a reasonably safe remedy in children's bowel complaints.

Bromoform still continues to give satisfaction in the treatment of whooping-cough, although its use has apparently been confined to only a few observers. Care must be taken to see that it is in its normal condition, that of a colourless liquid, for by exposure to the light bromine is set free and colours the liquid. Foreign observers are most pronounced in its favour, and more practitioners in our own country should put investigations on record.

Bromol (tribromophenol) is not new, but has been known as the product of the action of bromine in excess on carbolic acid. As it has been found now to have marked antiseptic properties, this short name has been given it, both for convenience in use and to be in harmony with the already too many new compounds being pushed forth, and most of which have names less indicative of their true composition. It has been applied with vaseline to open wounds, with success. Its internal uses have been in cases of typhoid fever and cholera infantum. Little has been written yet on its therapeutic uses.

Cactina is the proximate principle of the night-blooming cereus, and has been found by Dr. O. M. Myers to be a valuable cardiac stimulant. His results are very gratifying, and go to show that it has less disturbing effects on the stomach than digitalis. His observations deserve attention.[1] Observations of others are not on record.

Camphor in the form of camphorated oil (1 to 10) has been given a share of the universal attention paid to phthisical patients during the year past. Good results have followed from its hypodermic injection by practitioners in Berlin. It has been tried in most pulmonary affections, and in bronchitis, tonsilitis, and coryza with some satisfaction. Nothing of note is mentioned from this country.

Cannabis Indica has fallen considerably in the estimation of the profession, both in the old and this country, due no doubt to its variability and often noticeable uncertainty of action. However true the cause may be, there is no doubt that an almost extreme limit has been reached, and the profession needs to be reminded anew of the marked value of the drug in many cases. Attention is therefore here called to the very favourable report of Dr. C. W. Suckling, M. R. C. P., as given in the

[1] N. Y. Med. Jour., vol. liii, page 681.

British Medical Journal.[1] He calls attention to its value in a form of insanity described by him, in the treatment of melancholia and mania, in chorea when arsenic has failed, in migraine, as a gastric sedative, and as a hypnotic—its value being well established in the treatment of all cases met with in insane asylums. It deserves more attention than the profession has given it of late.

Cantharidin, in the form of cantharidinate of potassium or sodium, has been brought forward by Prof. Oscar Liebreich, of Berlin, as an effective remedy in tuberculous affections, principally lupus and laryngeal phthisis. Dr. Wolfert, of Berlin, has called attention to the interesting fact, that as long ago as twenty years Russian peasants habitually employed a species of beetle in cases of cancer. It was early noticed that this principle, cantharidin, exhibited the remarkable property of exciting exudation from the capillaries. This led Dr. Liebreich to select it as he now recommends. He uses the potassium salt hypodermically, and states that the sodium salt is much milder in action. His experience, and that of several well known co-workers, show that markedly beneficial results may be expected in diminishing the destruction of tissue common to tuberculous affections. Dr. Gerhardt, however, is reported as having used Liebreich's treatment in twenty cases with unfavourable results. It is to be particularly noted that the German observers seem to be convinced that slighter disturbance is produced with cantharidin than with the tuberculin of Koch. Surely more extended clinical experience is much needed, and it is to be hoped that some other cases than hospital ones will be reported more generally by our own countrymen.

Chloralamid (chloral-formamide) is the new hypnotic obtained by the combination of chloral and the colourless, oily, liquid formamide—an organic compound allied to urea. Our foreign brethren are very enthusiastic over their results with it as a decided rival to chloral and sulphonal. Its best effects are produced in cases of idiopathic insomnia, cases where the insomnia is not due to either extreme pain or excitement. Although it may succeed in some cases in overcoming slight pains, it cannot be classed as an anodyne. It induces a natural and refreshing sleep, and, as a rule, is not followed by headache on waking the following morning. A sense of well-being is the result of the rest it affords. It is thought by some to be a deeper sleep than that produced by chloral. There have been some failures to produce sleep with it, but the per cent. is small. Some Parisian and German observers claim that its action is exactly the same as chloral hydrate, if allowance be made for the smaller proportion of chloral anhydride in the chloralamid. It was supposed that it acted by decomposing in the circulation, liberating chloral; but there does not occur with it the marked depression so characteristic of chloral. In the majority of cases it works well, but in

[1] Vol. ii, for 1891, page 12.

a small proportion there are unusual effects, not, however, in greater proportion than with morphia or chloral. There are no apparent cumulative effects, and no craving for it is noticed, although it may be given nearly every twenty-four hours for several weeks. Of late some success has been met in cases of epilepsy; but the most satisfactory results have been obtained in senile insomnia, pulmonary diseases, and hysteria. It appears to possess the very happy property of counteracting the desire to micturate at night in senile cases. It occurs in colourless crystals, with a mild, slightly bitter taste, and without odour. It is soluble in about ten parts of cold water, and one should be cautious not to dissolve it in warm water, or not to heat the solution after it is made, as it very readily decomposes. Its use in this country is rapidly spreading.

Chloralimide was first described by Pinner and Fuchs, who obtained it by the action of ammonium acetate upon chloral hydrate; but it is now claimed that it can be obtained in a state of greater purity by a more approved process. It occurs in long, colourless, needle-like crystals, without taste or odour. It is only slightly soluble in water, and is very stable in its composition, not being altered by air, light, or moisture, or by heating up to 179° C. At 180° C., however, it is decomposed, yielding chloroform and formanide. It is classed by its introducers as a superior hypnotic to chloralamid, and much stress is laid upon the very possible but culpable error the profession might fall into of prescribing the latter for the former, whereas it would look very pointedly to an outsider as if the rival adherents purposely chose such extremely similar names for their compounds that one might insidiously take advantage of the trade of the other. Little has been reported in a general way therapeutically upon the use of this agent.

Cocaine Phenate is a new salt formed by the combination of phenol with cocaine. Knowing the similar effects of these two ingredients, the aim of the introducer has been to substitute an acid element having some expected beneficial effect for the commonly used hydrochloric acid, which had little therapeutic effect, if any, and served no purpose other than to present the alkaloid cocaine in a soluble form. This new salt has now had a trial of about a year, and satisfactory results are reported from Germany. It has been employed in nearly every shape and in nearly every affection in which the hydrochlorate has been successful. No results of any extent have been reported of its use in this country as yet.

Creasote has met with very gratifying success in the treatment of phthisis during the past year. The profession seems to be quite unanimous in its approval of this remedy. It should be emphasised, however, that the beechwood creasote is the reliable article, as vouched for by the medical profession of both continents.

Creolin is one of the now very numerous products of the destructive distillation of coal tar. It is a very complex body, being a mixture of

several of the coal-tar products, of the consistency of syrup, and of a brownish-black colour. It makes a milky emulsion with water, which becomes sticky after standing. It is said to have now proved itself a more powerful germicide than carbolic acid. The well established value of the products of coal tar in many forms of eczema and psoriasis, and the cheapness of this particular product, led dermatologists eagerly to apply it in their specialty. A wash of the strength of about 1 ℥ to 8 fl. ℥ of water seems to have been about the favourite solution for the skin affections. Dr. Rothe, of England, has used a 5 per cent. ointment in erysipelas, eczema, and scabies, and is of the opinion that creolin forms a specific for the latter, being superior to sulphur in not producing an eczema of the skin and in not staining the linen. Several successful cases are now on record when used as an enema for typhoid diarrhoea in a solution of 1 ℥ to 16 fl. ℥ of water. A Brazilian practitioner reports having used successfully an application of a 1 to 2 per cent. solution for soft chancres. He claims that it acted more rapidly in some cases than either iodoform or corrosive sublimate. German observers have used a 1 per cent. solution in purulent ophthalmia neonatorum with varied success. Cases of thrush and aphtha have been cured, however, by washing out the mouth and pharynx with this strength of solution. As many as 2,000 midwifery vaginal injections have now been made at Breslau with very encouraging results. Creolin appears to have no special haemostatic action. In dental practice this article has become quite a favourite, and is used in a weak solution as a mouth wash, in treating suppurating surfaces, and as an effectual deodoriser of a dead cavity. In some cases among its varied uses, and especially in children, toxic effects are noticed, the urine showing the presence of phenol. A 1½ per cent. solution has been known to have produced marked toxic effects.

Cresalols (cresol salicylates) are crystalline compounds analogous to betol and salol. By heating molecular equivalents of salicylate of sodium, cresylate of sodium, and phosphoric chloride, one of three cresalols (ortho, meta, or para) is formed, depending on the sodium salt used. All three forms are bulky white powders, with an odour like salol, and insoluble in water. They are recommended to be used as antiseptic dusting powders. Being without disagreeable odour, they are preferable to iodoform, and it is claimed that they lessen the secretions from wounds more effectively. Nencki believes para-cresalol to be superior to salol for producing asepsis in the intestinal tract. Not much has been heard of these as yet in a general way.

Dermatol is the patented name given to the basic gallate of bismuth, introduced as an effective substitute for iodoform. It is made simply by bringing together bismuth subnitrate and gallic acid under proper conditions to form the new salt. It is described as a fine saffron-yellow odourless powder, insoluble in the ordinary solvents. By reason of this

insolubility its antibacterial action is confined to the immediate locality of application, and thus it comes in direct contact with the microbes there present, as iodoform is supposed to do. It is claimed that it has a desiccating effect as well, by which it dries up the aliment of the bacteria. Its astringent property is said to promote the healing process, and yet does not cause irritation, and is not absorbed. It is stated to be of value when given internally in gastric and intestinal affections. It does not appear to be poisonous in quite large doses. It has been used in the form of ointments, suppositories, emulsions, and by insufflation. A gauze impregnated with it has been of service. To avoid countenancing a patented article when it can be so easily accomplished, the profession would do well to prescribe bismuth gallate simply.

Diuretin (sodio-theobromine salicylate) is the name given to the double salicylate of sodium and theobromine. It is a white powder, readily soluble in water, but very unstable. It is easily decomposed by acids, and even exposure to the carbonic acid found in the air will be sufficient to break down the compound. It has been used principally in the old country, with increasing frequency since its introduction somewhat over a year ago. Its price is high, and this has been one of the reasons for its limited use in this country. The general results have been various, and some would doubt its usefulness. It is said to rival caffeine and digitalis in its having no action on the heart or nervous system. It is readily absorbed and markedly diuretic. As it would readily be decomposed in the stomach, one investigator claims that it does little good unless it be administered in some form whlch may pass the stomach unacted upon. It may be considered not only as a diuretic, markedly beneficial in cases of dropsy, but also as a cardiac remedy, especially in cases where disturbance of the circulation depending on valvular incompetence is present. In acute nephritis much greater diuresis occurs than in the chronic form. The quantity of albumen is not altered. In one patient with cirrhosis of the liver, no diuretic action was noticed. In a healthy man the amount of urine passed is greater. It was mentioned by Dr. C. Gram, of Copenhagen, in his original article, that the diuresis resulted from the theobromine in the compound, and that the sodium salicylate had no effect. Others doubt this conclusion, as accumulated observations go to show that sodium salicylate and salicylic acid both act diuretically to a marked degree. There appears to be some danger at times in cases of copious diuresis that the ascites and oedema may disappear so rapidly that collapse may occur. Foreign observers strongly advise more extended trial.

Ether versus *Chloroform* is the form of the important and animated discussion which has occupied a good share of the attention of our English brethren which has not been given to the subjects of Koch's "tuberculin," la grippe epidemic, and the report of the Hyderabad Chloroform

Commission. The conclusions arrived at by this commission were by no means satisfactory to a large part of the profession, and other investigations were started and completed during the year with conflicting conclusions. The English are surely partial to chloroform; and when recently the number of deaths under and following its administration were reported largely on the increase, it put the enthusiasts and the manufacturers on the defensive to explain the cause. The purity of the chloroform was, of course, loudly questioned; but by careful testing it was proved that the fault must lie elsewhere. The most conservative explanations given were, carelessness in administration and idiosyncrasy of the patients. Although a strong, but small, proportion of the English profession, and a very much larger proportion in our own country, confidently believe, both from experimentation on animals and from actual clinical practice, that ether is the safer and superior anaesthetic, still sectional teaching and actual long practice in the various sections confirm one's faith in the one he has been taught to use and has always used. The English, for example, are evidently wedded to the use of chloroform, and have been ever since its discovery. In our own country the sectional feeling is quite interesting, but apparently unexplainable, except in some such way as stated above. In the Eastern states we might almost say that ether alone is used. To be sure it is the home of ether; but ever since its introduction the teachings of the medical schools and the practitioners generally have been to anaesthetise with ether as a matter of routine. Again, in our Southern states, or, rather, south of Maryland, Pennsylvania, and the Ohio river, the profession, on the other hand, make use of chloroform as the routine practice. They are not as exclusive as the New Englanders on their side, but the preference is quite marked. At this stage of our progress, then, we, as a profession, throughout the civilised world, are quite divided in our preference for these two anaesthetics.

Ethyl Bromide (hydrobromic ether) continues to be used as an anaesthetic in minor surgical operations, but is most largely employed in dental practice. Owing to its very unstable nature, a word of caution again may not be out of place. Many fatal cases have been reported during the year, and its history from the very beginning has been marred by these constant unfortunate results. Even after following all the ordinary precautions as to using the *whole* of the contents of a purchased package at one operation, and as to avoiding exposure to light and air, apparently unexplainable and bad results follow in many cases. When it does act properly, it is such an attractive anaesthetic in its immediate effects and agreeable after-effects that the operator is strongly tempted to resort to it again and again, until, by some unfortunate carelessness or impurity, he has finally to record, like others before him, his fatal case.

Ethylene Bromide is a new sedative introduced to avoid the undesirable symptoms often noticed from the effects of the alkalies (potassium and sodium) usually used as the bases in the salts administered. It is a heavy, clear liquid, of a brownish tinge, with a taste at first sweet and afterwards giving a burning sensation, and with an odour much like chloroform. It is obtained by conducting olefiant gas into bromine at a low temperature. It has been used somewhat largely in the old country, in cases of epilepsy in both the young and old, with good effect, but is little known to us here as yet. It contains by weight 87 per cent. of bromine, and to this its action in epilepsy is attributed. It is insoluble in water. Care should be taken in prescribing not to confuse this with ethyl bromide last spoken of, as the difference in name is very slight when either pronounced or written. Fatal cases are already on record from confusing the two.

Euphorin is the somewhat trivial name given in the past year to the synthetic compound phenylurethane discovered and introduced in the year previous by Prof. Giacosa, of Turin. It has quite recently been more in demand, and the profession in this country are using it more freely. It is one of the numerous anilin products occurring as a white crystalline powder, with a slight aromatic odour, and with very little taste of any kind at first, but becoming somewhat acrid and clove-like. It is only slightly soluble in cold water. Adler early recommended it on account of its slight unpleasant after-effects and for the increased diaphoresis manifested. Neither phenol nor anilin occurs in the urine, and albumen and sugar are not met with, but probably the secretion of urea is increased. The analgesic effects claimed for it are variable. The cases of orchitis reported seem to be the ones most relieved. Its antipyretic properties are supposed to be effected by the dilatation of the peripheral blood-vessels, and these were looked upon as the chief properties of the compound, for the new name signifies a sense of well-being and comfortable relief which is characteristic of its action in the stage of apyrexia after its administration. Dr. L. Sansoni has found it free from any objectionable action, such as occasionally follows the use of antipyrin, acetanilid, phenacetin, and sodium salicylate. It is stated to be equal to twice its weight of antipyrin. It is claimed to have pronounced antiseptic properties. Dr. Sansoni applied the powder to indolent ulcers and chronic cases of ophthalmia, and met with such encouraging results that he urges further trials by others. Its action here is explained by the setting free of phenol, the result of its splitting up when in contact with the secreting tissues. Its quick and sure action in these cases, with very little pain, is its great recommendation. During the year, Prof. Stiller has used it quite extensively in the Jewish hospital at Pesth, not with uniformly good results, but in the large majority of cases with marked success. His cases were those of supra-orbital neu-

ralgia, sciatica, chronic nervous headache, rheumatic fever, chronic articular and muscular rheumatism, and in six cases of habitual hemicrania seen in private practice the results were remarkably successful. The doses employed were from three to six grains repeated from three to five times per day.

Europhen is the confusing name given to another of the now numerous substitutes for iodoform. Chemically it is iso-butyl-ortho-cresol iodide, and is the product of the action of iodine upon a compound body of the phenol type. It is said to contain 27.6 per cent. of iodine, and is a yellow amorphous powder, with an aromatic odour recalling that of saffron. It is insoluble in water, and care must be taken when solutions are made in alcohol, ether, chloroform, etc., that they be made in the cold, as heat decomposes it, setting iodine free. When applied to dry surfaces it appears to be inert, and in general it acts only when in contact with secreting surfaces, where it is decomposed and iodine liberated slowly. Its advantages over iodoform are its freedom from disagreeable odour, nontoxic effects, does not cake so easily, and is so light that a given weight will cover five times as much surface. It is especially applicable in venereal and syphilitic cases.

Exalgin (methylacetanilid) is the compound allied to acetanilid and introduced as an analgesic. It is not new by any means, as it was first described in 1874, and has now been before the profession for many years, but has only received meagre attention until very recent times. Even up to last year, as careful an observer as T. R. Fraser, of England, thought that although its analgesic power is not very great, still it might take a useful and important place among the remedies to relieve pain, on account of the freedom of its action from the disturbances accompanying the action of nearly all other pain-relieving agents. Dr. Sinclair Holden concludes that it is useless in alleviating pain due to mechanical or organic lesions. This would account often for its failure in apparently suitable cases where the cause is obscure. It has the advantage when given in small doses of being perfectly safe, and the general conservative opinion seems to be that the dose must be kept small, and repeated if necessary, as serious results have frequently followed overdosing. The affections in which it is of most marked service are the neuralgias, especially facial, anaemic, visceral and intercostal neuralgias, and also neuralgias of the various plexuses, and the ilio-lumbar pains due to uterine and ovarian disease. Angina pectoris, nephritic colic, and painful menstruation are greatly relieved by it. It should not be used popularly, but always under medical advice and direction.

Guaiacol is the liquid compound obtained by the fractional distillation of beechwood-tar creosote, and contains from 60 to 90 per cent. of creosote. It was years ago introduced as a substitute for creosote, and Prof. Sommerbrodt first used it in the treatment of phthisis. The literature

of the subject is now pretty extensive, particularly in the old country, and tends to prove that it is decidedly beneficial in the early stages of the disease. In order to carry out the so called intensive creosote treatment, it was necessary to get large quantities of guaiacol into the system, and thus the salt guaiacol benzoate was introduced under the name benzoyl-guaiacol or benzosol. This compound permits of the administration of an amount of guaiacol which otherwise would be almost impossible owing to its caustic properties. The results with this have been varied, but on the whole they should invite further trial. Guaiacol salicylate also has been introduced under the name guaiacol salol as an intestinal disinfectant. From Bovet's experiments it would appear that it splits up into its two parts of base and acid in the intestinal track. Quite recently Dr. W. H. Gregg, of our own country, reports [1] on the administration of the iodide by the intestines in the treatment of tuberculous disease of the lungs. He believes it to be the most active therapeutic agent we possess for this treatment, but it must be taken in large quantities. He says we need not hesitate to give by this method thirty to fifty grains without fear of overdosing, since it does not become poisonous until one hundred grains have been absorbed. The administration by enema is a simple and practical method, and one to which the patients do not object. The results are certainly remarkable, and deserve confirmatory testimony. Apparently one dose in twenty-four hours is sufficient.

Hypnal (monochloral-antipyrin) the hypnotic compound obtained by dissolving about equal parts of chloral hydrate and antipyrin in water, has continued in use since its introduction with somewhat varied success. In the beginning, L. Reuter claimed that it was therapeutically inert; Dr. Bardet, however, early considered it an antispasmodic as well as a hypnotic. The general opinion now appears to accept it as chiefly a hypnotic, although Dujardin-Beaumetz and Fränkel give it analgesic properties as well. The construction of the compound would of itself lead us to at once reason that it would be a useful remedy, as chloral in ordinary doses has little effect on pain, while antipyrin rarely produces sleep in relieving pain. It will, no doubt, receive much more attention by the profession during the coming year.

Ichthyol (ammonium ichthyol sulphonate) obtained from the dry distillation of a bituminous quartz found in the Tyrol containing fossil fish remains in great quantities, has been largely prescribed for external use for some time back, but it has only recently begun to find favour as an internal remedy. Its peculiar and unpleasant odour is greatly against it, which necessitates its being given in capsules, or otherwise disguising it. About ten per cent. of oil of citronella has been used to accomplish this end, which proves of additional service in rheumatic cases as it alone has been so used with good effect. Its external use has been fur-

[1] N. Y. Med. Journal, vol. liv, page 347.

ther pushed during the past year with somewhat varied success. Dr. T. Cranston Charles very recently reports having used it with success in many different ailments where external application is called for. Dr. Freund speaks highly of it as an analgesic and antiseptic in the treatment of endometritis, and the literature in its favour in this connection is now quite voluminous. Köstor makes good use of a one per cent. solution in gonorrhoea. Its antiseptic property is unquestioned. When given internally in conjunction with the external use, it improves the digestion and appetite, and makes a decided gain in the general health. Stocquart records favourable clinical results in using it to relieve the vertigo due to simple dyspepsia or indigestion.

Iodoform seems to hold on tenaciously to its claim for recognition, notwithstanding the now formidable and still increasing array of substitutes. The odour, of course, is the great drawback to its wide and more general use without disagreeable complaints. A few of the means to mask its odour may be here recorded. W. Pagenkopf recommends the addition of a small quantity of Russian turpentine oil, which would impart a peculiar and pleasant odour. Klingmann adds one part of iodoform to six parts of olive oil, and shakes for twelve hours before filtering off the clear saturated oil containing about three per cent. of iodoform. Dr. Ludwig Váczi prescribes an ointment of one part of creolin, two of iodoform, and twenty-five of vaseline. On allowing this to stand over night the iodoform odour will have disappeared, and only a slight smell of creolin will remain. He says it will be found that the creolin not only does not irritate, but it is also itself a good disinfectant.

Iodophenin is a new compound obtained by the action of iodine on phenacetin under certain definite conditions. It was introduced by Scholvien of Berlin as a powerful bactericide. It has a crystalline form, a heavy odour like iodine, an acrid, burning taste, and is practically insoluble in water. It is said to act promptly in as weak a solution as 1 to 5,000. Besides its bactericidal property, it is said to possess antiseptic and febrifuge properties as well. It is at present under trial by our foreign brethren. Nothing has been heard from it here as yet.

Lysol is the name given to a saponified product of coal-tar, chiefly composed of the cresols, and is liquid in form. It is one of the very newest antiseptics. The reports are yet meagre, and they come wholly from the other side of the Atlantic. It appears to be superior to all the other antiseptics, according to the reports. One of its important features is, that it makes a perfect solution in water. Michelsen says that after a little trial he found he could use it effectually wherever carbolic acid, iodoform, or corrosive sublimate was used. The dermatologists have used it mostly, so far, and with varied results. The most recent clinical report comes from Dr. Leslie Phillips, of Birmingham, England, who used it in the treatment of lupus. He says it is surely worthy of

extended use in the treatment of this disease, for a short period of treatment by it is sufficient to produce a decided improvement in the appearance of the disease, and the results are so pronounced as to suggest a permanency, the reality of which can only be determined, of course, after some time has elapsed.

Menthol (peppermint camphor), ever since its introduction into our materia medica as a remedy for neuralgia, has gradually expanded its general usefulness. The English have recently added it to their pharmacopoeia. Its use in neuralgias has become very general, and although its effect often is only temporary, still in some of the milder facial neuralgias and rheumatic pains the relief is more lasting. Its use in the treatment of pruritus generally has greatly extended. Its antiseptic and anaesthetic properties have been markedly developed within the past year. Wolf's extended use of it in diphtheria has been still further carried out with some success, but peroxide of hydrogen appears to outrank it in this application. Dr. Lennox Wainwright justly extols its use in the nasal form of hay fever, when mixed with ammonium carbonate and used as a smelling salt. The distressing symptoms are many times permanently relieved. One of the most recent uses to which it has been put is in the treatment of laryngeal and pulmonary affections. Dr. Walker Downie explains its mode of action,—first, locally, as an anaesthetic which relieves the cough accompanying the affection; second, as a decided stimulant without harm to the parts; and last, as an antiseptic, for, being extremely volatile, it is readily diffused throughout the lung. By this use the antiseptic is brought as closely in contact with the affected parts as is possible. Certainly by his form of treatment the majority of his patients have had marked relief, and some have actually been restored to apparent health.

Methyl and *Methylene* are two terms which with their affixes are hopelessly confusing to the practitioner. Rival manufacturers, eager to obtain predominant recognition, so manipulate terms that it is almost hopeless to get reliable clinical reports from the action of these various, but more or less similar, agents. A little explanation of each may not be out of place here. "Methyl blue" is an anodyne and anaesthetic, considerably employed in the treatment of diphtheria with some success. "Methyl violet" is pyoktanin, the new antiseptic of last year, which will be spoken of later on in this commentary. "Methyl chloride" is strictly a local anaesthetic applicable to neuralgias, and not an anaesthetic for inhalation. "Methlene chloride" is the anaesthetic so long used by Sir Spencer Wells with such remarkable success, and which everybody else, pretty much, is afraid of. It is claimed to be a mixture of one volume of methyl alcohol and four of chloroform. "Methylene bichloride" was brought forward recently as a local anaesthetic liquid, differing from the last in not being a mixture, but a definite compound

by itself. Lastly, "Methylene blue" is an anodyne and anaesthetic similar in action and in other respects to "Methyl blue," having been used in treating diphtheria with results like those obtained by the latter.

Microcidin (sodium naphtholate) is another of the newest antiseptic agents. It is a white powder obtained by the combination of B-naphthol with caustic soda, consisting in great part of naphtholate of soda, and for the remainder, of naphtholic and phenolic compounds. It is soluble in water, not caustic, and costs less than many of the other antiseptics. Dr. Berlioz states that it is somewhat inferior to corrosive sublimate and naphthol by itself, ten times greater than carbolic acid, and twenty times greater than boric acid, in its antiseptic power. Ulcers and suppurating wounds rapidly cicatrise, and gangrenous surfaces are effectually deodorised after washing with a 0.3 per cent. solution. The French only give reports of its successful use since its introduction. Little is known of it as yet in England or in this country.

Orexin Hydrochlorate (phenyl-dihydro-quino-azoline), the agent introduced last year by Prof. Penzoldt, of Erlangen, to promote the appetite, has met with rather conflicting results in its administration, and at one time it was about to be discarded as of little use, when its introducer came to the rescue in an explanation of its failures as being due to its administration in gelatin-coated pills, as first recommended by himself. He claims now that the gelatin is in some way acted upon by the drug, and thus renders the whole insoluble in the stomach. He finally recommends it to be given in starch-paper wafers. Success appears to have followed from its use since, with several prominent observers; but surely it must be difficult to determine accurately the extent to which appetite is promoted in the economy by any one agent, when so many things have to be taken into account. Orexin hardly has a very promising future.

Paraldehyde has become well established with the medical profession, and serves as a serviceable alternate for the other hypnotics. It has recently been added to the British pharmacopoeia. Reports from various quarters still differ as to its scope of usefulness. Its taste and odour are against it, and they always have to be masked in some way. There appears to be a difference of opinion as to a tolerance of the drug.

Peroxide of Hydrogen (H_2O_2) has increased very rapidly in usefulness during the past year, and, in fact, it has had a steady growth ever since its introduction. It is no doubt the most powerful of all antiseptics and disinfectants. There are now several good manufacturers of the article, which creates a healthy rivalry, and thus a reliable article is pretty sure to be kept on the market. It has been used to a considerable degree in diphtheria and throat and lung affections for the past year or two, and up to the present time has rarely failed to do its work. When it does fail, it will be found to be due, in the majority of cases, to lack of care in keeping, or attempting to use from the remainder of a bottle which

has been long kept and possibly often dispensed from, and thus repeatedly exposed to outside air and the dust and dirt accompanying it. Surgeons in general, and obstetricians and gynaecologists in particular, are appreciating its usefulness more and more.

Phenacetin has justly grown in favour during the past year. It had a slight set-back at one time, due to a poisoning case, but it was finally found that it had been mixed with acetanilid for commercial gain, as the prices of the two vary considerably. It has now become official in the British Pharmacopoeia. Great and increasing success has been met in the treatment of typhoid fever. In one report sixty cases were treated, and only one death occurred. In the fatal case, however, the patient did not get the drug until three weeks after the beginning of the attack. There were no serious complications in any of the cases where the drug had a full chance—that is, in the fifty-nine cases. Whooping cough has been aborted quite successfully. Its effects in the first stage of influenza are very marked. Its action is prompt and striking. It rapidly cures the headache in the majority of cases, aids in reducing the temperature, and somewhat relieves the sore and tired feeling of the limbs, but not completely. A large mass of testimony in its favour has now accumulated from the two recent epidemics of la grippe. It has been used in nearly every variety of pain with remarkably good results. Large doses have been employed repeatedly with favourable results in acute rheumatism, particularly that due to gonorrhoea. It apparently rarely fails, no matter when used, in its sphere of usefulness; it is cheaper than antipyrin, tasteless, and, from the extended experience of many, it is quite free from the unpleasant after-effects of antipyrin, such as depression of the heart and the rash which often follows. A very minor objection, however, in comparison with so many good points, is its comparative insolubility.

Phenocoll is the abbreviated name for phenol-glycocoll, and is one of the very newest antipyretics. It is a very interesting compound, for the reason that the German chemists have gone about the matter very systematically to construct this compound synthetically, with the aim of producing the very definite therapeutic effects sought for. Antipyrin is known to produce unpleasant after-effects, phenacetin is too insoluble, and acetanilid combines both disadvantages. The problem, then, was, to produce a compound that should unite the best properties of antipyrin and phenacetin. The simplest way of rendering phenacetin soluble, at the same time retaining its non-toxic and antipyretic properties, seemed to be to introduce an acid-forming radicle. This was done, and the result expected was accomplished. This base, phenocoll, is capable of forming salts, and the hydrochlorate is the one to be used in medicine, and is readily soluble in sixteen parts of water. This ready solubility at once gives it a decided advantage over most of the other antipyretics. Being such a new agent, of course it has little clinical history yet. It has been

tried in Europe in cases of typhus fever, pneumonia, phthisis, and rheumatism, with most satisfactory results if foreign reports may be believed. Dr. Hertel, surgeon-major, who is one of the earlier clinical investigators with this agent, treated a small number of cases, to be sure, but he met with such good results that he urges the profession at large to give it a thorough trial. He lays great stress on the fact that the kidneys are not affected. In some cases where antipyrin, sodium salicylate, phenacetin, and acetanilid had been used with very little benefit, prompt relief was furnished with phenocoll hydrochlorate. When the article can be produced in large enough quantity to allow a very general use by the profession, great results are looked for.

Piperazin is the contracted name now given to the new uric acid solvent introduced last year under the name of piperazidin. When first introduced, it was supposed to be a synthetic spermin, but this is now doubted for several reasons. It is obtained in colourless and nearly tasteless crystals, and is easily soluble in water. It is not only much more soluble than lithium carbonate, but it will dissolve twelve times more uric acid. On theoretical grounds, then, alone, we can easily infer what result might be looked for after its administration. It has been tried experimentally by several continental observers, and found to come up to expectations sufficiently to deserve more extended trials. One French observer, however, claimed, from clinical observation, that uric acid was increased and urea diminished, but this was not afterwards verified. Its sphere of usefulness would appear to be in the treatment of gout and all kidney affections, although it has been tried with success as a diuretic and in a case of lead poisoning and a case of vesical ulcer. The dose used appears to have been about eight grains internally up to a daily maximum of about twenty-five grains. Subcutaneously five grains are used. The hydrochlorate apparently is the salt preferred, although the base is itself used. It gives no evidence of being toxic in its action. Reports are as yet very meagre from English and American observers.

Pyoktanin (methyl-violet) is the newly adopted trade name given to one of the anilin dyes long used for staining bacilli and micro-organisms; it is now believed to have a destructive action on these organisms, and it has been put forth as a new antisepsic and bactericide. There is another form called the yellow. Each is used for special purposes. The former seems now to be preferred in surgical operations generally, and the latter in ophthalmological in particular. Its pus-destroying property, from which it derives its name, is apparently well established at this time, but it has not shown uniformly good results otherwise. However, there are observers now who claim that it has little effect, if any, on suppuration, and the staining of the hands and clothes which accompany its use is strongly against it. This latter objection, however, has been met somewhat by the suggestion that these stains may be removed by soap-lather

well rubbed in, and washing or brushing off with alcohol. It has been employed in the treatment of cystitis with some favourable results; but in general urethral injections, where much good may follow, Mr. F. F. Burghard, of King's College hospital, claims that too strong solutions are recommended. He advises beginning with a solution not stronger than 1 to 3,000, and gradually increasing up to 1 to 1,500, otherwise irritation and scalding on micturation occur. On open wounds and ulcers, the powder is simply dusted on with good effect, and where they have become septic this agent is more efficacious than any other antiseptic. Remarkable success is reported from abroad from its use on malignant growths; and even cancer has been experimented upon, both here and abroad, with the result of ameliorating the suffering and of acting as an effective deodoriser. In the various affections of the eye very diverse reports are on record, both in this country and abroad. In general, the majority acknowledge that some good effects follow its use, but it has not yet arrived at the surpassing value at which its introducer would figure it.

Quinine has recently been artificially reproduced by a species of transformation of cuprein, which is the alkaloid obtained from the bark of the remijia pedunculata, or cupra bark of central South America. It is mentioned here for no other purpose than that of general interest, for the discovery comes in one way some years too late, as at present the price of quinine is so comparatively reasonable that no incentive is offered to go out of one's way to produce the article other than from the cinchona barks. This production artificially, however, is another striking illustration of the marvellous results the synthetically inclined chemists of our day attain to. These chemists thought this construction out somewhat as follows: They knew cuprein formed definite crystalline salts; they therefore produced the sodium salt. Then the possibility of substituting the sodium in this salt by a methyl group gave them reason to believe that the resulting compound would be quinine. This supposition proved to be correct, and resulted in a triumph for their endeavours.

Resorcin, one of the phenol derivatives, has stood the test of time remarkably well. Its most general use has been in skin affections, but good results have been obtained in whooping-cough and diphtheria, and in checking vomiting. Its anodyne effects may be increased until it acts in large doses as a hypnotic. Its antizymotic effects have proved very marked. There has been recently an increasing use in the treatment of the gastro-enteritis of children. It apparently arrests fermentation in the alimentary canal. It has an advantage over calomel when used in this affection by not increasing cardiac weakness. It has repeatedly given good results in cases of septic poisoning from post-mortem examinations. It has now been long enough on trial to become officinal.

Retinol (resinol) was discovered as far back as 1838, and is obtained by the distillation of Burgundy pitch or resin, and was known as resin oil. It has been used in surgery for some years back, in a limited way, as a good solvent for such agents as naphthol, camphor, or salol. It has recently been brought into more extended use, particularly on account of its being found to be a good solvent for quite a number of agents much used in surgery. It is not soluble in water. It is a good antiseptic, and is not irritating. It oxidises very slowly, and its keeping properties are thus of high value. Phosphorus dissolved in it keeps remarkably well. It is now used very largely in skin affections, with good results. In gonorrhoea, particularly in the male, injections have proved of great service. Its use is increasing very fast.

Saccharin is the coal-tar derivative introduced some years ago, and interesting now from the fact that the English have added it to their pharmacopoeia under the name glusidum (gluside). Its value appeared to be fully recognised, for three quarters of the delegates from the British Isles to the Medical Council recommended the addition of this article. Its value as an antiseptic, which seems to be of some amount, was rather secondary to its remarkable sweetening power. Its relation to cane sugar is as 1 to 300. It is a patented article, and this is one of the reasons why we do not hear more of it in this country, as the profession rather properly avoids patented articles; but an important additional reason is found in its variability in strength owing to adulteration. Its use in the diet of diabetic patients, and in those in which, for other reasons, sugar should be limited, gives good reasons for its being used to a larger extent than we feel disposed to at the present time.

Salipyrin (antipyrin salicylate) is not a new compound this year, but is interesting from the fact that observations at the dispensing counter led to its discovery. Antipyrin and sodium salicylate liquefy when mixed together, and Prof. Spica, of Florence, found that from the resulting liquid antipyrin salicylate was obtained. From that time it has been sold under the coined name of salipyrin. It has been used as an antipyretic with better effect in intermittent than in continued fevers. Its general use in quite all of the various forms of rheumatism has met with some favourable results; but, looking at the total for the year, they cannot be called remarkably encouraging. The price of the article has been somewhat against its general use, and many would claim that corresponding beneficial results may no doubt be reported from the administration of the antipyrin and the sodium salicylate separately, and in the varying proportions of each which the individual case might call for.

Salol (phenyl salicylate), the result of the combination of salicylic and carbolic acids, is not new, as it was prepared by Nencki in 1883, and introduced several years later. The hope previously expressed, that we had at last found a remedy of service in cholera, has hardly been ful-

filled, as the reports now are quite at variance. Reports come from special cholera hospitals with very little encouragement, while, again, from individual private practice much good is obtained. It continues to be used in typhoid fever with favourable results. From South America reports come of its being a reliable agent in accomplishing intestinal antisepsis in the diarrhoea of children when complicated by malaria. In France, observers meet with success in treating diseases of the urinary passages with salol. Its great claim is, that it holds in composition its two ingredients until it reaches the locality in the economy where its usefulness is needed, and there splits up into its component parts and accomplishes its good results. The proportion of carbolic acid there present, however, has its dangers, which are too well marked by sad experience. It is no doubt an irritant to the kidneys, as repeated evidence is given in the reports of nephritis due to the carbolic acid set free. Poisoning symptoms are often seen, and now many fatal cases are recorded. The general conclusions to be drawn, then, would be, to use the agent with great caution, and avoid too prolonged use.

Somnal is the hypnotic introduced last year, and is said to be made by the union of chloral, alcohol, and urethane, and resulting in a complex but definite compound with the above name. It is now questioned whether this is a definite compound as stated, as investigators now claim that they find it is simply a mixture. However this may be, the report of some observers are so partial to its use that it would appear that each component part has a beneficial and modifying effect on the other, thus giving results which are not obtained by the parts themselves. The pretty general opinion at this time is, that it is a safe hypnotic, less depressing, perhaps, than chloral, and serves as a good alternate to use for the other agents of its class.

Spermin, which received such marked attention from Dr. Brown-Sequard some time ago, and which was about dying a natural death, has been momentarily brought forward again by the recent announcement that the well known firm of Schering, of Berlin, had succeeded in preparing it synthetically, and had registered this as a trade-mark word in Germany. They were supplying it to the profession in extremely small quantities, confining it largely to a limited number of hospitals and clinics for investigation and reports. Little has been reported as yet in regard to this artificial article, and what favourable reports have come to light may be explained away by other causes present than this agent. Our verdict in this case would be very similar to that of Dr. Paul Werner, who says that the tonic effects were strictly psychical, the temporary increase in strength being due to the excitement of the experiments and confident hope of their good results. He further argues that similar results have been obtained by many forms of charlatanism.

Styracol is another new agent to be added to the now numerous ones

to be used chiefly in the treatment of tuberculosis. It is described as the cinnamic ether of guaiacol. It is split up when taken internally, and the resulting component part, guaiacol, is supposed to be the effective agent. It is claimed to be a powerful antiseptic, promoting healing in open wounds and ulcers. Internally, good results are looked for in cases of chronic catarrh of the bladder, the stomach, and the intestines. It has no clinical history as yet to speak of, and the outlook is not very promising.

Sulphaldehyde is one of the newest hypnotics. It is a complete analogue in composition to paraldehyde, the oxygen of the latter being simply replaced by sulphur. It is an oily substance, with a disagreeable odour, obtained by the action of sulphuretted hydrogen on ethylic aldehyde in aqueous solution. As yet it has only been tried on animals,—frogs and rabbits,—and was found to produce a quiet, deep sleep, without any symptoms of excitement. It acted more powerfully than paraldehyde. It is completely excreted by the urine, to which it gives its characteristic odour. We may hear from this agent during the coming year.

Sulphonal is one of the usually safe hypnotics which has had very wide use, and has largely increased during the past year. Two of its properties of great merit are its odourlessness and almost tastelessness. Its effect has been noticed to last over to a second and third night; and if this peculiarity is noted, it has its evident advantages as well as disadvantages. Italian observers have mentioned favourable results in diabetes. It diminishes the quantity of sugar, the polyuria, and the thirst. They also have noticed its good effects in either greatly diminishing, or entirely suppressing, the night-sweats in phthisis. Dr. D. D. Stewart, of Philadelphia, recommends it to be taken thoroughly dissolved in as hot an aqueous solution as agreeable. Sleep is then induced very soon after taking, and thus the usual delay of an hour or more before the effect is ordinarily produced is avoided. Dr. W. H. Gilbert, of Baden-Baden, reports danger from its popular and steady use. It is surely bad practice to leave the matter in the patient's hands to the extent of directing him to take a certain dose whenever he cannot sleep, as is apparently the practice with some. There are evidences now on record of the habit being established approaching that of morphia. Fatal cases also have been reported during the past year. For such an effective and widely used hypnotic, then, the conclusion should be to use caution.

Thiol is the patented product obtained by heating the hydrocarbons in ordinary "gas oil" with sulphur until sulphuretted hydrogen ceases to come off, and then adding an equal weight of sulphuric acid. This was introduced last year as a substitute for ichthyol, and used principally in skin affections. It is now used in practice both in a powdered

form and in a concentrated aqueous solution. Its odour and taste are not quite so marked as ichthyol, but its general physical character is similar. It also does not stain so badly as ichthyol. Gottschalk now gives the results of his nine months' experience with the agent in inflammation of the uterus and its appendages. He used a ten or twenty per cent. solution in glycerine. Large pelvic exudates have been made to disappear in a few weeks. Inflammatory erosions about the vagina are treated as successfully by applications of the powder. The uterine colic which often follows the application of iodine to the endometrium does not follow from the use of thiol solution.

Thymol, the product of the fractional distillation of the volatile oil of thyme, obtained from the plant thymus vulgaris, has long been used now as a substitute for carbolic acid in its varied applications, with the great advantage of having a less disagreeable odour, and causing no pain, as it is not irritating.

It has recently found a new use in the treatment of chyluria dependent upon filariae in the blood. As a remedy for this affection has long been sought, the favourable report by Surgeon-Major E. Lawrie, of Hyderabad, of a cure of two cases is worth noting.[1] The important practical point noticed was that thymol destroyed the organisms present in the system. Reasoning *a priori*, Dr. Lawrie tried it extensively in diseases such as leprosy, phthisis, and gonorrhoea, but without success. His conclusions, then, are, that either thymol acting evidently as a fatal poison to the filaria is not a poison to the bacillus, which seemed to him very unlikely, or the bacilli are not the cause of the diseases above mentioned. Other cases are now necessary to corroborate Dr. Lawrie's good results.

Tinctura Ferri Chloridi has not given for the past year or two the favourable results formerly derived from the preparation, and many practitioners have asked the cause. It may be found largely in the official preparation as laid down in the United States Pharmacopoeia of 1880. The United States Pharmacopoeia of 1870 very properly authorised an excess of acid to remain present in the freshly made product, and directed it to be set aside for a prolonged period. Thus, ethers were developed which were markedly beneficial, especially in cystitis and other bladder complaints. The present United States Pharmacopoeia of 1880 directs only sufficient acid to be used in the preparation to make the reaction complete. Thus, a sample of this latter preparation which has stood aside from three to six months has no more ethereal odour than when freshly made. It is to be hoped that the present Revising Committee now at work will remedy this defect and return to the old formula.

"*Tuberculin*" (Koch's liquid) is a brownish, syrupy liquid of about the colour of a weak iodine solution. It is supplied for clinical pur-

[1] The Lancet, vol. i, for 1891, page 364.

poses—principally to hospitals—in white glass, well-corked bottles, containing about fifty grammes. The solution for immediate use is then made up freshly, as needed, of one per cent. strength, with sterilised distilled water. The dose varies from a few milligrammes up to one gramme of the latter solution. The injections are made with any hypodermic syringe, but preferably with one with Koch's modification.

As all well know by this time, considerable attention has been given to this agent by investigators and writers since its unexpected and, for the time, undesired presentation to the world. There is now little doubt that Prof. Koch would very much have preferred to keep the preliminary results of his investigations entirely within the circle of his own little band of co-workers until he should feel that the proper time had arrived for their promulgation; but a somewhat pardonable desire, on the part of the medical as well as the secular press, to spread the news of a possible cure for one of the most destructive enemies to humanity set the whole world ablaze with enthusiasm over such a prospective triumph, and led us all into that inevitable error, which we almost invariably fall into every time a new remedy is introduced, of making very erroneous and extravagant deductions, and thus doing harm to the very subject we would desire to see advanced. We should all have no little spmpathy for Prof. Koch in this predicament, which we have actually forced him into, and make due allowance for the presumptive manner in which the subject now so vital to his reputation was so prematurely handled. It has been recently given out that he proposes shortly to publish a third communication on his treatment, and to make known the long wished for manner in which "tuberculin" is prepared.

Prof. Koch has many enthusiasts in his behalf in the medical world, and, naturally, many skeptics; but all fair, conservative minds, not carried away for the moment by unlimited desire for novelty, and who have the advance of the true science of medicine at heart, cannot fail fully to agree with Prof. Rudolf Virchow, when, in debate before the Prussian House of Deputies in Berlin, last summer, on the granting of additional funds for Koch's Institute for Infectious Diseases, he said,—"I have never expressed any opinion to my professional brethren on the fundamental value of Koch's method, simply because I do not know how such an opinion can be formulated. I have only communicated a series of personal observations, which have indeed been of service in directing attention to one part of the question, and have especially enforced the need for calm and objective study that is so requisite in these difficult subjects. . . . The question has, in fact, been developed in unexpected directions, leading in many quarters to the hope that very striking results can be produced by those powerful measures—a hope which we cannot yet say has been annihilated. As a matter of fact, there is not a single case known in which any form of tuberculosis has been cured by this

means. All cases which were for a while regarded as cured have afterwards been found to relapse: the improvements were merely temporary, such as often occur under other treatment. On the other hand, there is no doubt whatever that many serious dangers have been revealed, with regard to which I may claim some merit for myself. I have not yet seen any need to retract one word from that which I wrote at the end of January, in compliance with a ministerial request. . . . No doctor who feels called upon to make further trial of the remedy could by any possibility lay himself open to prosecution. The original trials were, in point of fact, made after results had been obtained in animals, which seemed to justify the expectations that were raised regarding the discovery." The year to come will no doubt show which way the tendency lies.

Urethan (ethyl carbamate) has grown greatly in favour during the past year, and justly so, for it proves itself more and more to be a mild hypnotic, with rarely a disagreeable sequence, and usually successful in all cases of insomnia not due to pain. In a few cases its effects have proved uncertain; but this occurs with most mild remedies. Under proper directions it is a very safe and effective hypnotic to give children.

Veratrum Viride has not received the attention it deserves, for the past few years. The reason is hard to find, unless it be that the profession has been so much occupied with the consideration of the overwhelming number of novelties that this well established and long tried remedy has fallen into comparative disuse. Its quality, and that of its preparations, have not deteriorated in the least, and therefore the profession should make use more largely of its beneficial action. It has always proved of marked value in the treatment of pneumonia; and, to bring up the subject again before the profession, we find Dr. T. G. Stevens, of Iowa, has made a study of the drug, and has published his results. His notes deserve perusal, if for no other reason than to kindle a renewed interest in its use.[1]

Weights and *Measures* are subjects which have received considerable attention from scientific men generally in this country for the past few years. They are now of renewed interest, as very decided steps have recently been taken to further the change from our confusing and cumbersome American system to the more rational, and in the end easier, decimal, metric, or French system, as it is variously called. The latter is as much superior to the former for ready comprehension and easy translating from one grade to another as our present monetary system is to the English. The English themselves are now beginning to see the disadvantages of their old system in the line of trade with other nations, as, with the exception of our own country, most other nations use the metric system.

[1] Gaillard's Med. Jour., vol. lii, page 210.

Our government, two or three years ago, very properly saw fit to legalise the metric system, and it is now, in fact, the only system authorised. It is in use in the navy department, the marine hospital service, the coast survey, and the post-office.

In September, 1889, the American Association for the Advancement of Science appointed a committee to promote and urge the use of the new system among all scientific bodies and individuals. They have been diligently at work, and now fruits of their efforts are evident in every quarter.

One of the most important recent advances to the pharmaceutical and medical professions occurred in the Convention for the Seventh Decennial Revision of the United States Pharmacopoeia, held in May, 1890, when, by an almost unanimous vote, it very definitely directed the Revision Committee to adopt the metric system exclusively.

It therefore now behooves us all to see to it that we make ourselves thoroughly familiar with the working of this new system, and all who have used it at all practically will surely predict a finally universally preferred system.

LATERAL CURVATURE OF THE SPINE, AND ITS ASSOCIATION WITH HERNIA.

By S. E. Milliken, M. D., of New York County.

October 30, 1891.

It is pretty well agreed that attempts to correct the rotation of the spine, which so frequently accompanies lateral curvature, has proven anything but satisfactory. The recognition of the deformity in its incipiency, or the detection of any impairment in the patient's physical condition that may lead to such deviation in the spinal column, is important. It was in noting the physical condition of patients in the hernia department of the Hospital for Ruptured and Crippled that my attention was called to the frequency of such deformities, in varying degrees that had not been recognised by the patient. The pathological conditions of each (hernia and lateral curvature) will, I think, account for the frequency with which they occur in the same individual.

The two theories as to the cause of hernia, as Wood gives them, are,—First, "the chief cause of rupture consists in the inefficiency of the tendinous or muscular-containing walls of the abdominal cavity in resisting the pressure from within;" second, "mesenteric elongation." The former theory has by far the greater number of supporters. The supposed cause of lateral curvature of the spine, in addition to a general impairment in the physical condition, particularly of the muscular system, is the greater weight of certain internal organs on one side of the body, the liver being thought to account for the frequency of curvature to the right side. Right-handedness has been given; but occasionally a deviation may be found to the left in right-handed subjects, and *vice versa*.

In my opinion, the majority of the cases are dependent on

a lack of development of the muscles supporting the spinal column, aggravated by the faulty positions assumed. The latter cause is particularly noticeable in school children and factory girls. The association of my two subjects, when looked into more carefully, may be questioned, as it is a well known fact that girls are more frequently afflicted with lateral curvature, while boys are more often the subjects of hernial conditions. The girls do not have so much out-of-door exercise as boys, and there is added to this the usual atony of the muscles just prior to the first appearance of the menstrual flow. On the other hand, the greater size of the cord structures in boys, as contrasted with the round ligament in girls, will, in a great measure, account for the preponderance of inguinal hernia in the former sex. In both sexes, however, I have been surprised at the frequency with which hernia and lateral curvature co-existed, particularly where trusses had been worn for a length of time. I am not convinced but that badly fitting trusses, causing the patient to assume unnatural positions, have something to do with producing or increasing the spinal deformity. The degree of curvature will have a great deal to do with the results from treatment, which has been divided into (1) postural, (2) gymnastic, (3) mechanical. We must admit that it is difficult to distinguish between the first two, and I should prefer to make it (1) gymnastic, (2) mechanical. It has been advised to combine the two, which seems entirely impracticable, as the use of the brace will only keep the muscles at rest that should be supporting the body. After a thorough inspection of the spine in the position that the patient assumes with the greatest ease, note the relations of the inferior angle of each scapula to the spinous processes and to each other, the extent to which the head and neck are held forward, and the relation of one shoulder to the other.

The patient would best be photographed in the *worst* position. It will afford about the best means of recording the deformity that we have at our disposal. At this examination, photographs should be taken that will show to what

extent the deformity may be corrected by position. Even in well advanced cases it is sometimes possible almost entirely to correct the lateral deviation. The extent to which rotation has advanced can be made out by having the patient bend forward, the body being held at a right angle to the lower extremities, and the arms allowed to hang loosely in front. The prominence of the side toward which the curvature tends will, as a rule, be more marked than the degree of curvature would lead one to suspect. The chest circumference should be taken, and the thoracic expansion. Another very important measurement to be made is the length of the limbs. Should one be found shorter than the other, a high shoe must be placed on the foot of that side, which will tend to lessen the spinal deformity.

Medical Gymnastics.—While there are a certain number of exercises that can be prescribed in almost every case, special movements, executed frequently in the presence of the physician, will afford the best results. The mother, or some other member of the family, should be present at each visit, that she may be able to criticise the patient when exercising at home. The best hours for exercise are on rising in the morning and just before retiring at night. Every garment should be removed, and a photograph of each position should be in front of the patient. The exercises should be gone through with before a large mirror. No one movement should be continued until the patient is fatigued. The whole series should be gone over twice, during the thirty or forty minutes allotted to it. With a well fitting truss, not only may the spinal muscle be exercised without any danger of the hernia's protruding, but the most violent strain on the abdominal muscles may be allowed with perfect safety. The last named muscles are developed by having the patient assume the dorsal decubitus on a bed or lounge, with the arms folded across the chest. The feet being steadied by some one, the body is brought slowly to the sitting position, and back to the recumbent position, for fifty or a hundred times, according to the strength of the patient. In delicate

children the relaxed linea alba will be quite noticeable when the recti are put on the stretch in this way.

General Gymnasium Work.—I question the advisability of allowing children afflicted with lateral curvature of the spine to go into the gymnasium and do the routine exercises. The inefficiency of such a course has been brought to my notice from examinations of school children, who were required to exercise two days a week with dumb-bells, Indian clubs, horizontal bars, etc.

After being photographed in various positions showing the deformity, and in those positions which the patient is to assume while exercising, the patient is to be seen daily until all the required movements have been taught. The mother, on whom the most reliance can be placed, should be in attendance at each visit, so that, with the assistance of the photographs, she can see that each exercise is gone through with correctly.

From posture alone, as I have seen in several cases, the narrowness of the chest may be rapidly overcome, so that the wearing-apparel may soon need to be changed. This suggests the importance of the proper kind of waists to be worn by children under treatment. They should be few in number, and of greater thickness. The underwear, as well as the dress, must not only be loose in front, but in the back as well. Should the latter detail be overlooked, the patient will very soon be found depending on the garment for support, instead of on the back muscles. No case should be permitted to wear a brace, that is not old enough to understand the exercises; even then massage should be tried before beginning mechanical treatment. The support, whether made by a plaster-of-Paris corset, or any other spinal support, must be harmful, in that it produces muscular atrophy.

In advanced cases of deformity, where exercises have failed to relieve the symptoms, and when the bony deformity is increasing, the last resort is a brace.

Mechanical treatment will not be dwelt upon otherwise than to say that I prefer the plaster-of-Paris corset, applied with the patient self-suspended.

These few remarks have been made, not with an idea of showing some remarkable results from treatment by means of gymnastics, but to encourage early diagnosis.

In answer to questions, Dr. MILLIKEN said that he had tried both self-suspension and the ladder exercise, without much benefit. He did not believe in using any mechanical support until after a thorough trial of gymnastics.

DISCUSSION.

Dr. E. M. MOORE, of Monroe county, said, that a good many years ago, when he was especially interested in this class of cases, he had devised an instrument which he naturally felt sure must have been the best ever devised, of its kind. In the earlier stages of lateral curvature it had proved very efficient. The object of the treatment was to make the patient bend in an opposite direction to the curvature, and a modification of the old apparatus known as Tavernier's belt had, in his opinion, fulfilled this condition. By attaching to the belt around the pelvis a contrivance similar to that commonly employed in cases of infantile paralysis, he had been able to hold this belt in position, and to so adjust it that, as the patient stepped forward, the whole weight of the body was called upon to hold the brace in place. After the application of the apparatus, the patient was instructed to walk a good deal, and, after a time, the frequent efforts to get away from the band became habitual, and resulted in a straightening of the curve. In this way he had been able to straighten some pretty bad cases of curvature, and make them entirely well.

Dr. THOMAS H. MANLEY, of New York county, had been for a long time past of the opinion that in these cases of spinal distortion we had frequently done too much in our efforts to bring about a cure by mechanical treatment alone. Not only should the special elements in the individual case be specially studied, but we should not lose sight of what nature can accomplish, unaided by calisthenics or by apparatus. In children one year old, it was the exception to find a perfectly symmetrical spine; and the tendency was for children to outgrow these deformities, when of rachitic origin, which was most commonly the case. It was well to allow very young children to remain for a long time upon their backs. Plaster-of-Paris jackets, by interfering with the nutrition of the muscles, tended rather to aggravate than to improve the condition. A gentleman who recently showed him a series of spinal cases, pointed out one in which the head was slightly thrown back, as a specimen of the normal spine. He did not agree with this view; the "military spine"

was not the normal spine, and was wanting in both flexibility and strength.

Dr. MILLIKEN remarked, in closing, that rotation was comparatively rare in children; but after it had taken place, he had never seen a patient recover from the deformity.

MEMOIR OF JAMES BATHGATE, M. D.

BY JOHN SHRADY, M. D., OF NEW YORK COUNTY.

Dr. James Bathgate, an original member of the New York State Medical Association, who died of pneumonia, March 27, 1891, was one of the six children of a worthy Scotch-Presbyterian couple, who came to this country early in the century, and became tenants of Gouverneur Morris on the Morris Patent, West Farms.

In 1848 these children bought the four-hundred-acre farm, which for nearly half a century has been known as the Bathgate homestead. From this farm pieces have been sold, leaving a balance of about seventy acres valued at about $500,000. Bathgate avenue, intersecting fifteen streets, was named in honour of the family.

Dr. James Bathgate, born about 1825, attended school in Harlem, graduated at Mount Pleasant academy at Sing Sing, was a student under Prof. Joseph M. Smith, and finally received his degree in 1846 from the College of Physicians and Surgeons, New York. He was for three years on the house staff of the New York hospital, on the medical side, and afterwards became connected with the New York Dispensary. Subsequently he devoted himself to private practice, chiefly among his aristocratic neighbours, to whom his genial though somewhat retiring manners strongly recommended him. He was a man of rigid integrity, scholarly tastes, devoted to the comfort of his brothers and sisters, who, with but two exceptions, lived a life of single blessedness like himself.

MEMOIR OF WM. NELSON BLAKEMAN, M. D.

BY MR. A. N. BLAKEMAN.

William Nelson Blakeman was born in 1805, in Roxbury, Litchfield county, Conn. He was descended from the Rev. Adam Blakeman, a graduate of Oxford University, who emigrated in 1638, and settled at Stratford, Conn. On his mother's side he was descended from the famous Col. Elderkin, a prominent character in the history of Connecticut during the Revolution. Dr. Blakeman graduated from the Yale Medical School in 1832, pursuing his studies in the offices of Professors William Tully and Thomas Hubbard. He came to New York city immediately after his graduation, and located in the 9th ward. That was the year of a cholera epidemic in the city, affording an opportunity to establish an active practice, which he accepted with all the zeal and enthusiasm of a young practitioner anxious and ready to make a place for himself. During the epidemic an attempt was made to limit its spread by fencing off the lower part of the city, and Dr. Blakeman was among a number of physicians who took up their residence in the infected district, and remained cut off from all communication with the rest of the city until the embargo was removed. I find attached to his medical diploma the certificate of the county clerk of the filing of a copy of his diploma. His certificate of membership in the Medical Society of the City and County of New York is dated June 9, 1834, and is signed by John B. Beck, M. D., president, and I. Van Rensselaer, M. D., secretary His certificate in the New York Society for the Relief of Widows and Orphans of Medical Men, is dated August 15, 1846. He was an early member of the New York Academy of Medicine, and of the New York Medical and Surgical Society. He was a corporate member of the American Medical Association. In subsequent years he was a member of the New York State Medical Association, the New York Journal Association, and the New York Physicians' Mutual Aid Association. He was always actively interested in the benevolent work of the city, having been appointed in 1836 one of the managers and attending physicians of the asylum for the blind, which positions he filled until an increasing practice compelled him to resign. He was also an attending physician of the Eye and Ear Infirmary when it was located in Waverly Place. In later years he was a director of the New York Infant Asylum, and at the time of his death was honorary president of the board of directors. He was a member, and for many years counsellor, of the New England Society of this city.

Dr. Blakeman was an active Christian man, and prominent in church matters. He was a member and trustee of the Carmine-Street Presbyterian church while Mr. Downer was its pastor. He was one of the original members, and subsequently an officer, of the Mercer-Street Presbyterian church, and at the time of his death was an elder in the Brick Presbyterian church. For a number of years he was one of the executive committee of the American Tract Society.

In politics he was a Whig, and subsequently a Republican, and during his residence in the 15th ward was for a number of years trustee of the public schools of that ward.

I find among his papers a commission, dated June 25, 1835, and signed by Gov. Marcy, as hospital surgeon on the staff of Brigadier-General Wm. L. Morris, 45th Brigade, New York State Infantry.

During the Civil War, Dr. Blakeman several times responded to the call of the president for medical aid. He spent several days on the field of Gettysburg, after the battle, in hospital service; and in Washington, when that city was crowded with the wounded brought in from Antietam, and from engagements before Richmond.

In 1834, Dr. Blakeman married Miss Helen R. Robertson, whom he survived twenty years. They had eight children, five of whom are now living,—four sons and a daughter.

Mrs. Blakeman was a granddaughter of the fighting parson of New Jersey, of Revolutionary fame, the Rev. James Caldwell, of Elizabeth, N. J.

MEMOIR OF MARY WILSON CASE, M. D.

BY E. D. FERGUSON, M. D., OF RENSSELAER COUNTY.

Born in Vernon, N. Y., February 22, 1856.

Graduated at Vassar college, A. B., 1878, A. M., 1881; at the Woman's Medical College of Philadelphia, M. D., 1881; in New England Hospital for Women and Children, Boston, 1881–1882.

In general practice, in Syracuse, N. Y., 1882–1885, and in Troy, N. Y., 1885–1889.

Member of the Medical Society of Rensselaer county and of the New York State Medical Association.

Died at Lansingburgh, N. Y., August 19, 1889.

The above statement gives the principal events of the life of Dr. Case, but not all that would interest her friends.

She started in life with a delicate and rather frail physique, but with a good stock of energy and activity. It was a matter of serious doubt, when she contemplated the student life, whether she had the strength equal to her strong desire for it. The life at Vassar, however, proved favourable to her health. Her friends yielded with some reluctance to her choice of a profession, which resulted in her taking the course of the Woman's Medical College.

She was an indefatigable student, and found her highest enjoyment in her studies, rather than in the social circles which were open to her; nevertheless, she had many attached and valued friends who had similar aims.

In her professional career she was always an eager student as well as observer; the microscope, especially, took a large part of her attention.

In practice, she was wholly devoted to her patients, never sparing herself fatigue or exertion. The dignity and seriousness of her profession were always present, and perhaps gave her an air of coldness and reserve. But for her patients there was a never failing supply of sympathy and kindness.

In 1887 she had a severe attack of pleurisy, which left her with a weakness of the chest from which she never fully recovered. During the great storm of March, 1888, she suffered seriously from exposure, and her former troubles were aggravated. But she did not spare herself when any call was made for her services. She took no respite, except for two short seasons in the Adirondacks and the White Mountains. She died from heart failure, August 19, 1889.

The absence of selfish motives, the thorough devotion to the interests of her clients and to the profession she had entered, were recognised and acknowledged. Without exception, she had the respect and confidence of all her professional associates.

MEMOIR OF GEORGE W. EARLL, M. D.

BY J. W. BROWN, M. D., OF MOTTVILLE, N. Y.

George W. Earll was born in Mottville, February 22, 1837, and died July 8, 1890. His father was a farmer, living just north of the village, and his boyhood was passed around and upon this farm. He received the ordinary district-school education, and ultimately attended the Homer academy. He passed the usual apprenticeship of teaching, in the vicinity of his home and elsewhere, and finally entered the office of his brother, Dr. J. B. Earll, at Central Square, Oswego county, graduating from the Buffalo Medical College in 1858. He began the practice of his profession in the same place, in partnership with his brother, the same year, remaining with him until April, 1862, when he removed to Skaneateles.

Upon August 29, 1862, he was commissioned second assistant surgeon of the 81st Regiment, N. Y. S. Volunteers, and served honourably, until discharged upon surgeon's certificate, in South Carolina, March 26, 1863. He also held a commission as surgeon in the 75th Regiment of N. Y. V. of New York, until its disbandment upon November 14, 1868.

His medical life-work was taken up, upon his convalescence after his return from the army, at Skaneateles, and eventuated in a large and lucrative practice for many years. He was essentially the family physician to a large proportion of the surrounding community, and to many his early death will have the effect of a personal loss. Sympathetic in temperament, yet rigid in his enforcement of his own ideas, he possessed much of that personal magnetism that is so essential in maintaining the confidence of the patient. He was skilful as a diagnostician, and in the use of remedies was ever a seeker after the newer preparations. He was a successful practitioner in more than the ordinary sense, both generally and obstetrically, and for years easily outranked his confrères at the bedside.

It had long been known that, while looking the perfection of health and manly vigour, he was far from well. I well remember that my first acquaintance with him was in 1875, when I found him suffering intensely with angina pectoris. This tormented him greatly for years, and it was only by rigid adherence to diet and medication that he was enabled to withstand the fatigue of the arduous work imposed upon him. He first sought rest in Florida in 1874, and again in 1878. Not feeling equal to our winters, he began going continuously, with the winter of 1884. He early became identified with the several resorts frequented, and interested himself financially in a winter colony at Clearwater in 1887. He

was more or less active in professional work, applying himself quite energetically the past three years.

He became a member of the county society January 31, 1865, was elected its president June 24, 1884, and was well known by all the older members, who so often met him at its meetings.

He was a liberal contributor for the support of religion, especially of the Universalist faith, being baptized as a member the Sunday before his death.

He was elected a permanent member of the state society in 1871, and became a founder of the N. Y. S. Medical Association in 1884, at the time of the split from the original society.

He was a member of Skaneateles Lodge, 522, F. and A. M., and past high priest of Charles H. Platt Chapter, 247, R. A. M.

Politically he was always identified with the Democracy, and served upon the board of supervisors in 1872, and was active in its representation in conventions.

He was a member of the board of education for three years, 1869–1872.

He married Lydia R. Kinne, in Richfield Springs, in 1861, leaving no children but an adopted daughter, Miss Kittie, who (with the widow) alone survives.

His illness was plainly the result of overwork. He was stricken with congestion of the brain, with aphasia, in October, 1889, and recovered sufficiently to leave for the South before the holidays. He recuperated slowly, and upon his return in the latter part of May was much like his former self. He personally assured me many times that he would "go slow" and take life easy; yet such was the force of habit, that unconsciously he was soon working beyond his strength. After a long ride in the country the previous day, and passing a restless night, he attempted to attend to some critical cases, and finally came home from an obstetric case completely exhausted, sinking into almost a congestive chill. He rallied, and the next day made several visits, was again prostrated, and did not then heed the warning; was again likewise imprudent, and was then prostrated,—gradually sinking from exhaustion and softening of the brain, becoming completely paralysed at the last. His death occurred upon July 8, 1890, at 3 a. m., and he was buried at Richfield Springs, July 10, 1890.

Such is the history of the man whose early death we deplore. Stricken in his prime, does it not convey a lesson to the living? While not essentially a student, our brother was a worker, and while but little accustomed to the recording of facts, we who personally knew him were aware of the results of his work at the bedside. He was energetic, and while financially not required to labour as hard, he was ever impatient at the thought of "becoming a back number," as he expressed it. He wanted to wear out in the harness, and he had his wish at the age of fifty-three years.

MEMOIR OF ELI FOX, M. D.

BY H. H. GREEN, M. D., OF HERKIMER COUNTY.

The life of Dr. Eli Fox, a Fellow of this Association, was brought to a close on the 13th of October, 1890, at 2:30 a. m. The disease that caused his death was chronic Bright's disease of the kidneys.

Dr. Fox was an able physician, a courteous and affable gentleman, a public-spirited citizen, a true and consistent friend. It may be truthfully said of him that he was honest, capable, and faithful to every trust. Born amid humble surroundings, he touched the very bottom round in poverty's ladder; but with him there early arose a desire for knowledge, both technical and practical. He pursued his studies with an assiduity that knew no such word as fail, and he entered the teachers' ranks while quite young.

In 1851 he entered the office of Dr. Parkhurst, of Frankfort, Herkimer county, as a medical student, and graduated with honour, in 1855, from the University of New York. He practised medicine for a few months in Schenectady county; but he soon returned to his native county, and settled at Mokawk, where he continued his practice until his death.

He married Miss Eliza Margaret Christman, September 17, 1856, who survives him to mourn his loss.

For over thirty-four years he went in and out before a people that delighted to acknowledge him as their friend, neighbour, and physician. The extent of his benefactions, and the number of rough places that he made smooth, will never be known until his record shall be read to an assembled world.

The subject of this memoir, Dr. Eli Fox, was born in the town of Columbia, Herkimer county, August 12, 1833; died in Mohawk, Herkimer county, October 13, 1890.

MEMOIR OF JOHN P. GARRISH, M. D.

BY WILLIAM T. WHITE, M. D., OF NEW YORK COUNTY.

JOHN P. GARRISH died at 2174 Seventh avenue, New York city, April 1, 1891, aged about seventy-six years. He was born in New Brunswick, N. J., and afterwards studied medicine, graduating from the Jefferson Medical College, Philadelphia, in 1836. For a time he was associated with Dr. G. B. McClellan, of Philadelphia. In 1840 he came to New York, and opened an office in White street. Later he had an office in the Seventh ward, then in Broadway near 13th street, then in West 21st street, West 57th street, and for two or three years past in Harlem, where he died.

He was an Original Fellow of the New York Academy of Medicine, and for many years took great interest in its meetings, especially in the obstetric sections, of which he was for a time chairman. He was a member of the Medical Society of the County of New York, of the Society for the Relief of Widows and Orphans of Medical Men, of the Pathological Society, and of the New York County Medical Association.

About 1854 he and Dr. Mark Stephenson started an ophthalmic hospital in Stuyvesant street, where it flourished for a few years, and then it was moved to the frame house at the south-east corner of Fourth avenue and 28th street, the home of Peter Cooper. After a few years he and his confrères were ousted from its management by the underhand work of one or two of its officers.

His wife died several years ago. His son, Dr. J. Pool Garrish, died in 1882.

His remains were interred in Greenwood.

MEMOIR OF WILLIAM B. SPRAGUE, M. D.

BY M. W. TOWNSEND, M. D., OF GENESEE COUNTY.

Dr. William Bishop Sprague died at Pavilion, March 16, 1891.

It is with emotions of grief and loneliness that I, the playmate of his youth, the friend and acquaintance of his maturer years, write this announcement. Identified by his own life and his ancestry with the whole history of our section, the doctor's death, at the prime of his strength and manhood, shocks us by its unexpectedness, and warns us that we, too, are approaching the one sure terminal of the journey of life.

William B. Sprague was born in Pavilion, April 6, 1836. His father, William M. Sprague, M. D., was widely known through western New York for his ability and integrity, both in his profession and out, and the great hope he cherished was that his only son might succeed to his profession, his honourable reputation, and the confidence of the community. With the means at his command he endeavoured to fit him by education for such a career, that he might fill it worthily. William B. Sprague received the early rudiments of learning at the select school taught by A. J. Abbott, Esq., now of Geneseo, N. Y., who so faithfully laboured with the youth of that generation, and to whom so many of us owe the taste for information, the love of the right, and the respect for manliness he strove to instil in his pupils. At the close of Mr. Abbott's career as a teacher, he entered the academy on Temple Hill, Geneseo, and spent several years in that institution, and as a teacher of our common schools.

Having arrived at an age to choose his life-work, he selected the profession of his father, and was entered as a medical student at the Buffalo Medical College, where his natural abilities soon placed him in the front rank of his class, and from which he graduated with honour and with special commendations of his professors. The first field chosen by him in which to practise the healing art was at Westmoreland, Oneida county, N. Y., where he resided for several years, and won a flattering position as a young practitioner, removing in 1860 to York, Livingston county, N. Y., at his father's instance, who wished his only son nearer him, and there built up a large practice, and many of his old patients continued to call upon him to the last. Dr. W. M. Sprague dying in 1867, the young doctor, as he was called, moved to Pavilion to care for his mother and sister, and has since made that place his home.

In his profession, especially in the surgical division of it, he stood in the front rank, and was for many years the president of the Genesee County Medical Association; was relied upon as a counsellor by his co-practitioners, and as a standard-bearer by the regular physicians. As a son, his care for his aged mother (now ninety-two years of age) was all that love and respect could give, and nothing in his power was undone to provide for her declining years. As a citizen, his course was positive, never dictated by self-interest nor swerved by favour. What he deemed right, he pursued, regardless of others' opinions or of the effect upon himself. While we might disagree with his conclusions, we knew where to find him, and that what he promised he would perform. As a neighbour, he was obliging and helpful, and many now recall the favours and aid received from his hands. While a good friend, he was also a good foeman, and never shrank from accepting the consequences of his own acts and words. Witty, educated, aggressive, and active, he was ever prominent in the discussions and topics of the time, and gave and took hard blows with equal zest.

With him the Sprague name becomes extinct in the town of Pavilion, and, for the first time since its settlement, must be dropped from the rolls of its prominent citizens. As a friend of education, he was noted as a model school officer, and for the time and labour he gave to advance the efficiency of the local schools.

While liable to be at variance with those of his own age and position if cause arose, every child in the village was his fast friend and sworn comrade, and he never was happier than when adding to their pleasures.

But he is gone! Neither talents, nor strength of body or of mind, neither friendship nor enmity, availed aught when the hour struck. And for us it is left to learn wisdom, both by his successes and his failures, and to hope that our obituaries can truly place to our credit as many good qualities as belonged to our lost neighbour and friend, Dr. Sprague.

MEMOIR OF F. O. VAUGHN, M. D.

BY GEORGE L. BROWN, M. D., OF ERIE COUNTY.

Frank Owen Vaughn was born at 315 Franklin street, Buffalo, N. Y., March 15, 1847. He was educated in the public schools in his native city. In his early manhood he engaged in the upholstering business, which he abandoned to become a druggist: that vocation he followed very successfully about six years. He pursued his medical studies with Dr. S. S. Greene, a physician in large practice, receiving the degree of M. D. from the University of Buffalo in 1880, and immediately engaged in the active practice of his profession.

Dr. Vaughn was appointed district physician May 1, 1885, and held that position up to the time of his death. He was untiring and unselfish in his profession, which he loved. He was a member of many societies, among which were Queen City Lodge, F. and A. M.; Keystone Chapter, Royal Arch Masons; Hugh De Puyens Commandery Knights Templar; Ismalia Temple, Nobles of the Mystic Shrine; Acacia Club, A. O. U. W.; Empire Order of Mutual Aid, Knights of Honour; Erie County Medical Society; an Original Fellow of New York State Medical Association.

In 1865 Dr. Vaughn married Miss Elizabeth Elwood, of New York. Three children were born of this marriage, only one of whom, a daughter, is now living.

Dr. Vaughn was bluff and outspoken in manner, yet withal, warm-hearted, genial, courteous, obliging, and kind. He made friends of all whom he chanced to meet, as he was possessed of a social and cheerful disposition and temperament. In his social and medical life he was ever ready to assist the needy, and to befriend those whom he considered really deserving of his aid and sympathy. He did much good in many ways unknown to the world at large.

Dr. Vaughn was, at the time of his death, only forty-four years of age. After five long weeks of patient suffering under a complication of diseases, he died at his residence on Swan street, March 18, 1891. He is survived by his wife and daughter.

REPORTS OF THE DISTRICT BRANCHES.

FIRST DISTRICT BRANCH.

The seventh annual meeting of the First District Branch of the New York State Medical Association was held at Hotel Warner, Amsterdam, on July 21, 1891.

The meeting was called to order, at 10:30 a. m., by the Secretary, in the absence of the President; but the latter, arriving in a short time, took the chair.

The minutes of the last meeting were read by the Secretary, and approved.

The report of the Treasurer was read and approved. It showed the receipts to have been $3 and the expenditures $9, leaving a deficiency of $6. Those present contributed $11 to pay the indebtedness to the Treasurer and for the current expenses of the Branch.

There was quite a full attendance of Fellows and guests from Fulton, Oswego, Herkimer, Montgomery, Schenectady, and Rensselaer counties.

The President's address being the first in order, was read, and heartily applauded. He spoke of the rapid progress made in the different departments of medicine; of pathology, wherein bacteriology or the germ theory of disease had been investigated from so many stand-points that the causation of many diseases by micro-organisms had come to be considered an established fact; of the many fields open for investigation, each requiring work of a high order, together with patient research; of the knowledge resulting from this work, and its application in the prevention and treatment of disease; of antiseptic surgery, whereby what were formerly exceedingly dangerous operations may now be undertaken with expectation of success. He also spoke of the value of the "collective reports" in medical matters.

A recess was then taken for dinner, which was furnished at Hotel Warner by the Fellows residing in Amsterdam.

The afternoon session was opened by the presentation of several interesting clinical cases; after which, Dr. Isaac de Zouche, of Fulton county, opened the reading of papers with one on "Preventive Medicine." He dwelt upon the lesson to be derived from the epidemics of the Middle Ages, and showed their value to us, particularly if properly understood by boards of health and others having authority in matters of sanitary

police. He considered that the members of the medical profession should regard themselves as teachers and apostles in the great sanitary reforms that are now in progress. Their efforts should be directed towards a more enlightened view of morbid processes,—that many diseases may have their causes demonstrated and the cause removed, so that plagues and other epidemics would be truly things of the past. He felt that the time would come when many of our diseases would be generally recognised as the result of the violation of a known law, and due to inexcusable ignorance, culpable neglect, or vicious habits. Medical men must be the educators of communities to that higher civilisation that recognises preventive measures, sanitary surroundings, an uncontaminated water-supply, perfect drainage, perfect sewerage, perfect plumbing, perfect ventilation, and that perfect cleanliness which is next to godliness.

Dr. W. D. Garlock, of Herkimer county, then read a paper on "Typhoid Fever in Children" (see p. 472), which was discussed by Dr. J. B. Harvie, of Rensselaer county.

Dr. Charles Hammer, of Schenectady county, read a paper on "Cholera Infantum."

He referred to its aetiology and symptomatology, and noted that it was often the cause of a large increase in the summer mortality, and that it was not confined to large cities, or even crowded tenement districts, but occurred where there were good sanitary surroundings, and then even in its most malignant form. It should not be confounded with the simpler diarrhoeas of summer, as it is much more serious; but the line of demarcation is not very clear, and sometimes cannot be drawn.

The typical cases of cholera infantum, however, have strongly marked symptoms, and the fatality is so great that it is an object of dread to the anxious mother and the sympathetic physician. The child, on passing its second summer, is to be congratulated on having practically left behind so formidable an enemy. Improper food stands at the head of the causative agents, though dentition and other influences may stand as predisposing factors. Hand-fed babies are more prone to the disease than those nursed by the mother. Substitutes for the mother's milk, emanating from chemical laboratories and food factories, are dangerous. In treating the victims of this disease, give them plenty of fresh air, let the clothing be light and loose, bathe the skin several times daily, dispense with all proprietary foods, and give the mother's milk, or good and fresh cow's milk, which should be boiled to protect from chemical change. In using cow's milk, sometimes a small amount of bicarbonate of soda seems to render it more acceptable to the stomach, and lime water does a like service, as occasionally does peptonising. A little barley water will allay thirst and furnish some nourishment, and may be given in small quantities at short intervals. Small doses of calomel, say one tenth of a grain, are often useful where the stools are green. A chalk mixture,

consisting of chalk, bismuth, gum arabic, glycerine, catechu, oil of cinnamon, oil of anise, and oil of coriander, with sufficient water to make a somewhat creamy mixture, may be given in five drop doses and repeated half hourly. It is antacid, carminative, and tonic. A drop of deodorised tincture of opium may be added each three hours if necessary.

Dr. John Edwards, of Fulton county, read a paper on "Professional Quackery," in which he illustrated some of the numerous frauds perpetrated by quacks.

Dr. W. H. Robb, of Montgomery county, reported a case of the habitual use of morphine, and described his method of treating such cases by the use of the hypodermic syringe, the tablets being finally of the "blank" or inert variety. In that way the patient has the aid of the belief that he is getting the drug.

Dr. E. D. Ferguson, of Rensselaer county, read a paper on "Imperforate Rectum" in which a case successfully operated upon was made the text for a consideration of the varieties, the causation, and the treatment of congenital occlusion of the rectum and anus.

On motion, the present Executive Committee and the Secretary were continued for the ensuing year.

On motion, it was decided to hold the next annual meeting at Rome; but authority was given to the President and Secretary to change the place if it should prove advisable.

Adjourned.

DOUGLAS AYRES, *President.*
EZRA GRAVES, *Secretary.*

SECOND DISTRICT BRANCH.

The seventh annual meeting of the Second District Branch New York State Medical Association was held in Troy, at the Young Men's Association hall, June 25, 1891.

The meeting was called to order by the President, Dr. A. T. Van Vranken.

The minutes of the last meeting were read and approved.

On motion of Dr. Burton, the thanks of the meeting were tendered the Young Men's Association for the use of the hall.

Twenty-two were registered.

The subject of the President's address was "A Résumé of the Recent Epidemic of Typhoid Fever in Albany County, with its Probable Cause."

The paper was discussed by Drs. Van Zandt, Seymour, and Ferguson.

Dr. D. W. Houston read a carefully prepared report of "A Case of Supra-pubic Cystotomy for Removal of a Large Urinary Calculus." The patient was present, and exhibited to the members.

Dr. W. W. Seymour gave a report of seven operations for removal of cataract, and five operations "trephining mastoid," illustrating operative procedure for relief of inflammation of middle ear.

He also reported a case of laparotomy for the removal of gall-stones,—the case progressing favourably for some time, when pneumonia supervened, and resulted fatally.

Dr. J. B. Harvie gave a paper on "Purulent Pleuritis in Children." He presented two children for examination by the Association, in whom he had made free incisions, washed out the cavities with sublimate solutions, followed by sterilised water, and left in drainage-tubes, both cases recovering.

Dr. W. W. Seymour related a case of neglected empyema, where, after a paracentesis, food was discharged through the drainage-tube. This, he thought, was caused by a rupture of the oesophagus through the mediastinal tissues.

Dr. Seymour also showed a patient who had fracture of skull last October by a heavy stone thrown from a sling. This patient had convulsions a few hours after receiving the blow, on the side opposite the injury to the head. He trephined, and raised the depressed piece of skull, the wound healing in a week.

Dr. H. C. Van Zandt read a paper entitled "Preventive Medicine."

Dr. E. D. Ferguson gave a résumé of congenital obstruction in the ano-rectal region, with a case of imperforate rectum.

The Executive Committee for 1892 were chosen in the usual manner, as follows:

Albany County, W. B. Sabin.
Clinton County, E. M. Lyon.
Columbia County, T. F. Woodworth.
Essex County, Lyman Barton.
Greene County, Robert Selden.
Rensselaer County, J. P. Marsh.
Saratoga County, Ianthus G. Johnson.
Schenectady County, H. C. Van Zandt.
Schoharie County, Wm. Hagadorn.
Warren County, G. R. Martine.
Washington County, A. J. Long.

Dr. D. W. Houston presented a case for examination of injury of a child's foot by an electric car, where there was extensive sloughing of the soft parts, after which skin grafts were put upon the healing surface.

There being no further business before the meeting, it was adjourned.

A. T. VAN VRANKEN, *President.*
CHARLES H. BURBECK, *Secretary.*

THIRD DISTRICT BRANCH.

The seventh annual meeting of the Third District Branch of the New York State Medical Association was held in the court-house at Binghamton, on June 18, 1891.

The meeting was called to order, at 10 : 30 a. m., by the Secretary, who announced that the President, Dr. J. D. Tripp, was unable to be present on account of illness.

Dr. J. G. Orton nominated Dr. H. O. Jewett for President *pro tem.* Dr. J. H. Chittenden seconded the nomination, and Dr. Jewett was unanimously elected.

The reading of the minutes of the last meeting was omitted, as they had already appeared in the volume of Transactions.

Dr. J. G. Orton then presented the report of the Committee of Arrangements.

The President appointed the following Nominating Committee:

Dr. C. L. Squire, Chemung County.
Dr. Geo. O. Williams, Chenango County.
Dr. F. W. Higgins, Cortland County.
Dr. J. B. Drake, Delaware County.
Dr. H. D. Didama, Onondaga County.
Dr. J. H. Martin, Otsego County.
Dr. Elias Lester, Seneca County.
Dr. W. L. Ayer, Tioga County.
Dr. William Fitch, Tompkins County.

The following were in attendance:

Drs. J. H. Martin, C. W. Greene, J. G. Orton, C. L. Squire, F. W. Putnam, James B. Drake, William Fitch, William L. Ayer, Charles W. Ingraham, L. H. Hills, F. L. Forker, E. A. Pierce, F. P. Hough, J. M. Farrington, Geo. O. Williams, E. H. Wells, R. A. Seymour, S. P. Allen, N. Jacobson, H. D. Didama, J. H. Chittenden, H. O. Jewett, F. W. Higgins, J. F. Place, L. J. Brooks, W. A. Moore, P. A. Hayes, George Douglas, H. C. Lyman, A. S. Johnson, L. D. Farnham, J. D. Meacham, W. H. Knapp, F. W. Ross.

The following invited guests were present:

Drs. D. S. Burr, E. L. Johnson, C. E. Eastman, F. E. Slater, C. D. Spencer, E. L. Bennett, H. F. Beardsley, H. T. Dunbar, and J. F. Pratt, of Binghamton; Dr. F. D. Reese, of Cortland; Dr. A. D. Johnston, of East Branch; Dr. L. D. Witherill, of Union; and Dr. E. L. Smith, of New York.

The Secretary read the report of the Executive Committee, and the Association then took up the scientific work of the meeting.

The following are abstracts of the papers read:

H. O. Jewett, M. D.—Common Injuries of the Elbow Joint. These injuries assume special importance from the following facts: The frequency of their occurrence, sometimes from apparently trivial accidents; the peculiar and complex anatomy of the parts; the extent of the articulating surface, and the number of bones, ligaments, and tendons involved; the amount of spongy and fragile osseous structure in the expanded extremities of the bones; the frequent obscurity of the diagnosis; and the proverbial tendency to final anchylosis and deformity. In no class of cases have I ever observed such rapid and inordinate swelling and inflammation, tending to mask the real nature and extent of the bony lesion, as in injuries in the vicinity of the elbow joint.

The examination must be sufficiently thorough to enable the surgeon to arrive at a clear and satisfactory diagnosis, otherwise the future integrity of the member, the welfare of the patient, as well as the reputation of the surgeon, may be seriously compromised. The surgeon who, through embarrassment or conceit, trusts to a hasty and superficial examination, relying upon his native astuteness, may be satisfied with a hasty judgment, and find occasion to repent at his leisure.

In luxations at the elbow, the peculiar and striking deformity would of itself leave little occasion for errors in our diagnosis, were it not for the common and perplexing complications which are often present. In backward dislocation—by far the most common, and generally the result of a fall upon the outstretched palm—the strong projection of the olecranon, together with the altered relations and increased distance between that process and the condyles of the humerus, would appear to be sufficiently diagnostic; nevertheless, we are told that this luxation has sometimes been confounded with, or mistaken for, fracture of the lower end of the humerus—a mistake which could hardly occur in the absence of considerable swelling of the soft parts.

Lateral dislocations, usually from a violent wrench or twist of the arm, are still more rare, and generally only partial. If complete, they are attended with great deformity, and with extensive laceration of the investing ligaments and tendons, likely to be followed by excessive inflammation and infiltration of the surrounding tissues, not infrequently resulting in suppuration and final serious impairment of the functions of the joint, if not destruction of the limb.

Complete dislocation of the forearm forwards, without fracture of the olecranon, would seem to be a physical impossibility, and is, indeed, so rare as to be doubted by many surgeons.

Dislocation of the radius alone, forward and in the direction of the ulna, is a common accident. The head of the bone rests in the bend of

the arm, above the coronoid process, and beneath the tendon of the brachialis anticus, and some fibres of the biceps as they are expanded for insertion into the fascia of the forearm. This injury is sometimes overlooked, though there would seem to be little excuse for such a mistake, as the swelling is usually moderate. Reduction is readily accomplished by moderate extension and supination of the forearm. If left unreduced for a few days only, adhesions take place, and may render the reduction quite difficult.

Sometimes the round head of the radius, resting in the bend of the arm, is easily returned to its place upon the condyle of the humerus, but apparently refuses to fall into the lesser sigmoid fossa of the ulna, where it belongs. A little force seems to press it home, but it will immediately spring up again. In this case it carries before it a floating flap of the lacerated annular ligament and connective tissue, which, by interposing or insinuating itself between the articulating surfaces, causes the difficulty experienced in our efforts to replace and retain it in position. I have several times encountered this apparent entanglement of the head of the radius in the lacerated ligamentous structure. I could force the bone down into its place, but it would spring up again, and viciously resume its abnormal position the moment I relieved it from pressure. However, they have all recovered so as to make a much better cure than I anticipated.

A fall forward, striking upon the outstretched palm of the hand, is most likely to produce these luxations, though the head of the radius may be, and doubtless frequently is, knocked from its position by a direct blow upon its outer side, or it may be thrown out by a sudden, forcible twist of the arm when the muscles are tense, or the head of the bone may be forced backward, carrying with it a fragment of the external epicondyle.

There are cases reported of forward luxation of the radius which have resisted all efforts at reduction, on account of some obscure ligamentous or tendinous entanglement, but I have never encountered such. I have seen one case where the head of the bone appeared to rest beneath the tendons of the biceps and brachialis in front of the humerus. Two surgeons had made repeated and persistent attempts, by extension, rotation, and pressure, without persuading the bone to quit its new and abnormal position. The patient refused to be etherised, or submit to further efforts, preferring to take his chance as he was. He finally acquired a fair use of the arm, but could never flex it beyond a right angle. The movements of the limb, in extension, rotation, etc., were tolerably free, enabling him to perform a good deal of ordinary manual labour on a farm.

Fractures at the elbow constitute a subject which has been thoroughly treated in our various text-books upon surgery, and I shall therefore confine myself mainly to such as have fallen under my own observa-

tion, and which, from the frequency of their occurrence, are of practical interest to us all, more especially to the younger members of the profession.

Fractures of the olecranon have been quite common—at the base of the coronoid process—through the middle of the great sigmoid fossa, and at the extreme point of the process, and resulted from kicks, blows, or falls upon hard surfaces, as upon stone pavements, or upon the ice in skating.

These fractures of the olecranon usually unite only by ligament, yet if the fragments be kept in perfect apposition and at rest, we secure a ligamentous attachment, so firm and strong as to answer all the purposes of bony union; while, if the fragments be widely separated, the joint will be perceptibly weakened. It is a wise provision of nature that the presence of synovial fluid precludes the formation of osseous deposits; otherwise, we would have true anchylosis much more frequently than we do. A ligamentous union, furnishing a yielding support, is often better than a stiff joint.

Fractures of one or both of the condyles of the humerus, likewise epiphysial fractures, with or without separation of the condyles, are by no means uncommon. When the condyles are detached and separated, the bones of the forearm are sometimes drawn up into the fissure between them, by the combined action of the flexors and extensors of the limb. When this accident occurs, considerable tact and skill are required to adjust and keep the fragments in place, so as to secure a good union without deformity or impaired mobility. In the process of cure, the dressings should be removed, and passive motion of the joint practised, as early as possible after the inflammation is partially abated. Certainly, as soon as it can be accomplished without displacing the bones, and even at the risk of some motion of the fragments, this practice should not be deferred too long. Not more than a week should elapse without giving it a trial, since it is better to risk some widening and deformity of the joint than no joint at all.

Epiphysial fracture of the ulna or radius does not often, if ever, occur; nor, in fact, is the radius often broken much above the junction of the middle with the upper third.

A longitudinal fracture of the head of the radius is spoken of by writers, but from my own observations, where the head of this bone has been believed to be broken, it has proved an error in diagnosis. Some months ago I was called to assist in dressing such a fracture, about one week after the receipt of the injury, but we found the head of the radius simply driven backward, carrying with it a chip of the external epicondyle of the humerus, still attached, and including a portion, or the whole, of the radio-humeral articulating surface. This case was well managed, and ultimately terminated in a good cure.

I remember a fracture of the external condyle, which united with callus, implicating the ulnar nerve in such a manner as to impair the motion, as well as the sensibility, of the ring and little finger, and the ulnar side of the hand.

Epiphysial fractures of the lower end of the humerus, and fractures of the condyles, have been rather common in my practice. I have sometimes had much trouble in satisfactorily adjusting the fragments, and still more in keeping them in their proper position. But I have always given these cases very close attention, and have had the satisfaction of observing that the cures have, as a rule, been much more perfect, the occurrence of any degree of anchylosis being far less frequent than I had anticipated in the early part of the treatment.

Unfortunate cases of complete anchylosis of the elbow are cases never to be forgotten. When this result is inevitable, the semi-flexed position is best tolerated; but, whether bent or straight, the infirmity is a very serious one.

Dr. Hamilton has devoted a long chapter to the subject of fracture of the coronoid process of the ulna, in which he has quoted and commented upon nearly all the cases which have been reported since the time of Fabricius Hildanus up to the date of the publication of the latest edition of his work upon Fractures and Dislocations.

The accident, unaccompanied with any other fracture, is conceded to be an exceedingly rare one, and many surgeons believe that a majority of the cases reported have been, in reality, errors in diagnosis.

I have met with one or two where I could account for the phenomenon upon no other supposition than that of fracture of the coronoid process, uncomplicated with any other fracture.

A young man came to me, several months after the receipt of his injury, with an elbow anchylosed, in a semi-flexed position; the forearm supinated, and slightly twisted upon the humerus. The forearm, from the condyle of the humerus to the wrist, was shortened half an inch, with a corresponding abnormal projection of the olecranon backwards. A rounded bunch could be indistinctly felt in the bend of the arm.

The case had been treated as a backward dislocation of the forearm; reduced, and dressed accordingly. After the first dressing the patient had gone away, neglecting to report himself to the surgeon.

Now it cannot be supposed that the smooth surface of the cochlea of the humerus would rest upon the joint of the coronoid process. The insertion of the tendon of the brachialis would tend to hinder this, and any motion of the arm, either flexion, extension, or rotation, would cause it to slip from its elevated position either backward into its place in the greater sigmoid fossa, or forward upon the bones of the forearm, lacerating the ligamentous attachments. In the former case the reduction would be accomplished, and in the latter the forearm would be com-

pletely dislocated, backward and upward, the olecranon projecting backward nearly or quite two inches, instead of half an inch, as it did. The condition was then, of course, irremediable without a violent breaking up of the anchylosis and a good deal of after treatment.

Respecting treatment.—We must remember that each case has an individuality of its own. Each may present peculiar features, requiring a special line of treatment. In the first place, the examination: we must be cautious, deliberate, and thorough. After a satisfactory diagnosis, your anatomical knowledge will enable you to appreciate any deviation from the normal relations of the parts, while your good judgment must determine the amount and direction of the force necessary to be applied, whether by extension, flexion, or rotation.

Dr. Jewett's paper was discussed by Drs. L. J. Brooks, F. W. Putnam, C. L. Squire, D. S. Burr, N. Jacobson, and H. T. Dunbar.

George Douglas, M. D.—The Tenth International Medical Congress at Berlin, as I Saw It. (See p. 486.)

J. H. Chittenden, M. D.—Report on an Unusual Complication in Labour. Mrs. R., aged 23, was taken with labour pains March 26, and at the end of about 35 hours was delivered of a female child. The patient's weight was about 120 pounds, and she had enjoyed excellent health up to date of confinement.

On attempting to make the usual digital examination, much difficulty was experienced in reaching the os, from the fact of an unusually long and unyielding perinaeum, it coming well up in front in a manner that I hardly know how to describe unless I explain by saying that the vaginal orifice seemed to commence well up near the Mons Veneris, and the finger was required to be well carried downward and under the pubic arch, at the same time crowding sharply upon the abnormally long perinaeum. The patient, at this time, had been 6 or 8 hours in labour with moderate pains. The os was dilated to about the size of a silver half dollar. The head was not crowding upon the perinaeum. The pains continued; labour progressed slowly; and at the end of about 35 hours it was evident that some aid should be given. Therefore I gave chloroform and applied the forceps, and by moderate traction brought the head down from its lodgment in the pelvic bones, until it began to press upon the perinaeum pretty sharply; then, as is my custom, I removed the instruments, and proceeded to terminate the labour without their aid. The occiput was posterior. The pains were vigourous, the soft parts bulging, and the head, pressing sharply downward, distending the perinaeum to a remarkable degree. With two fingers in the rectum, I made what pressure I could upon the soft parts to protect them. This had continued about 20 or 30 minutes after I had removed the forceps, when there came one of those terrible pains, in which all the energies of the

body and contractile powers of the uterus are combined, and forced the head through the soft parts, thus making the interesting complication of the case.

It appears that the head, instead of raising up and coming through the vulva in the usual manner, took a more direct course, and made for itself a passage through the perinaeum and rectum, the fourchette not being injured. Excessive haemorrhage followed. I found the fourchette and tissues that were not torn, about what might be represented by two ordinary lead pencils laid side by side. The laceration of the balance of the perinaeum was complete to the second degree,—*i. e.*, through the sphincter ani and one or two inches up the recto-vaginal septum.

The question then before me was, what should be done with these torn and ragged parts, and what would be the chances for getting primary union. My hasty consultation with myself (as I was without any medical adviser and one of the attendants was in a dead faint on the floor) brought me to the conclusion that I would better remove the fourchette, which I did with the scissors, and proceeded then to bring the parts together, using six sutures in all. One of the sutures, the first, included the ends of the torn sphincter and the recto-vaginal septum. This suture was the only one that was of any considerable benefit, and from it we got a very satisfactory union, giving the patient control of the bowels, both in regard to flatus and faecal matter. A second operation will be required to restore the balance of the perinaeum to its normal condition.

On the second day after delivery an extensive inflammatory condition commenced upon the right thigh and hip, of an erysipelatous character, which extended to the knee and over and across the abdomen, involving the vulva and the entire gluteal region of the right side. It was persistent, and threatened extensive sloughing for many days. General peritonitis came on, with great abdominal distention. This was followed by an attack of acute erythema involving the whole body. The catheter was used for a period of 77 days without producing the least symptom of cystitis. My patient hung on the ragged edge of death for many weeks. The sanitary surroundings were of the most discouraging character. After the patient had been cared for and the child dressed, the father took the child into the grocery (he being a grocer) and weighed it, the nurse assisting, and reported the weight as being 18¼ pounds, including the usual wrappings.

Nathan Jacobson, M. D.—Recent Cases of Bone Disease Occurring in Early Life. It is the accepted view of the profession to-day that tuberculosis is not transmitted, and as one of the specific reasons advanced, we have it said that tubercular affections are not met with at birth. Without desiring in the least to contradict this view, I am compelled to say that I have encountered, at a very early age, most discour-

aging forms of surgical tuberculosis. (The histories of cases were here given in support of the above.)

The most serious feature that comes from long delay, aside from the constitutional infection which very frequently occurs, is the local destruction. It happens only too frequently that tubercular bone disease, especially when affecting the joints, is regarded as a rheumatic affection, and it is only when the bone tissue has melted away, abscesses opened, and sinuses lead to the vestiges of the disease, that its real character is appreciated. Then, perhaps so much tissue has been lost and so much mischief done, that the simpler surgical operations of curetting and resection no longer avail. Amputation becomes the only resort, and the unfortunate patient must suffer because of the delayed surgical care. Even if it still be possible to treat these cases by the less severe surgical measures, the little patient has been so reduced in strength, that repair occurs tardily, and the entire tone of the system is so reduced as to render the patient particularly prone to tubercular disease of the lungs, meninges, or other structures. (Another series of illustrative cases followed.)

F. P. Hough, M. D.—Inflammation of the Vermiform Appendix: its Symptoms, Diagnosis, and Treatment. Inflammation in the ileo-caecal region, and more especially of the vermiform appendix, is a disease of modern recognition.

Symptoms: Uneasiness, followed by pain and soreness in the right iliac region, is one of the earliest as well as the most constant and persistent symptoms of this disease. On palpation, tenderness is found to exist in this region, and laterally, just above the crest of the ilium. The more the pressure is increased, the more is the pain augmented. Early in the disease the decubitus and sitting posture are characteristic. The body is turned toward the right side, and is flexed somewhat to relax the muscles on the right lateral plane. If the patient attempts to hold his body erect, or to straighten out in bed, he at once experiences additional soreness, and perhaps pain. The attack sets in, as a rule, with general malaise, slight rise of temperature, accelerated pulse, anorexia, nausea, and perhaps vomiting. The bowels are usually constipated, although diarrhoea may exist sometime during the attack.

If a patient recovers from an attack, he soon enters upon the stage of convalescence, which is usually of short duration, and to all appearances is well and none the worse for the attack, when suddenly, after a strain, blow, or fall, and even from no assignable cause, he is seized with the same symptoms as before, and, it may be, somewhat more aggravated, indicating a source of greater irritation. During one of these attacks everything may seem to be going on well, when suddenly the temperature goes up to 102°, 103°, or 104°,—but fluctuating in character, pain and tenderness greatly increased, pulse accelerated, slight rigours or

severe chills, great prostration and sweats,—and we may now be sure the disease has resulted in perforation of this organ with the formation of pus.

Diagnosis. Given a case with the symptoms as above detailed, there will be little hesitation in coming to a conclusion.

Another means of diagnosis is the aspirating needle, which at first sight might seem to help us out greatly; but if we use it and can find no pus with it, we cannot be certain there is none, and the use of the needle is not without its own dangers, hence it would be a wiser course to dispense with it altogether. The diagnosis between perforative appendicitis and perforative caecitis is rather difficult to make, but the chances are in favour of appendix perforation, owing to the rarity of caecal perforation. The necessity for an operation is the same in both. Inflammation of the loose areolar tissue around the appendix, or so called perityphlitis, presents much the same signs and symptoms. But the inflammatory changes in perityphlitis are now understood to proceed in almost all cases from lesions of the appendix vermiformis, consequently the symptoms of perityphlitis cannot be sharply differentiated. Acute intestinal obstruction might take place, causing an enlargment with pain and tenderness in this region. But a careful examination of the patient will usually exclude faecal impaction, intussusception, or volvulus.

Suppuration of the kidney or its envelopes may simulate disease of the appendix; but the situation of the swelling is not exactly in the ileo-caecal region, or, at least, is not confined to this region. Psoas abscess, especially as it occurs in children, is liable to be mistaken for disease of the appendix. Iliac abscess may occur and not be connected with either disease of the spine or caecum. An abscess in the abdominal walls has very many symptoms in common with abscess around the caecum, but there is no intestinal irritation. The pus discharged from an abscess in the abdominal walls is not so offensive. Tumors, both malignant and non-malignant, may occur in this locality. In that rare disease, cancer of the caecum, there is a fixed, firm swelling, but it is of very gradual growth, and usually produces a stricture of the bowel.

The treatment of inflammation of the vermiform appendix and neighbouring structures must necessarily vary according to whether the disease has reached the stage of pus formation, or whether it is prior to that stage. If it be the latter, absolute rest in bed is one of the first and paramount objects to be secured. Next, the diet should be restricted to nourishing liquids, such as beef tea, veal tea, mutton broth, etc. Milk may be used sparingly, but should not form the staple article of diet in these cases, for it has the unfortunate property of forming hard lumps due to the coagulation of the casein, and consequently becoming a source of greater irritation. Local blood-letting with leeches, followed by poul-

tices or hot fomentations, are the best means for combating the inflammatory action, and a little later on, resolution may be hastened by the application of blisters. If there be considerable fever, the pulse frequent, and arterial tension high, aconite or veratrum may be used with good effect. The bowels should be kept open by the administration of salines, calomel, or enemata. The opium, or so called "splint," treatment of this disease, which has been practised so much in years gone by, I believe is contra-indicated. If there be considerable pain, from four to eight leeches may be applied. If the pain should then continue, morphia may be used, somewhat reluctantly. If opium be given to the extent of quieting the bowels and forming a splint as it were, it masks the symptoms, and consequently we never feel so certain as to just what is taking place as we do without it. Severe pain is more often an indication for the knife than it is for opium. The knife will remove both pain and danger, and give permanent relief.

Resolution should take place readily in cases which are not to go on to the formation of pus. A slow and tedious recovery, relapse, or recurrence would point to the probable presence of conditions exceedingly dangerous to the patient, from the liability to general peritonitis or perforation. If the disease has progressed beyond the first or inflammatory stage, regardless of what has been done to check it, and pus has formed, the indications are now plainly to make a section and let it out, for the dangers are greater when pus is in contact with the peritonaeum or in the peritonaeal cavity, than an operation would be for its removal. These cases are of such a character that there is usually very little time for preparatory treatment. The field of operation should be made clean with soap and water, washed with ether or turpentine, then soap and water again, and then douched with a mercuric bichlorid solution (1 to 1,000). The umbilicus should likewise be cleansed, and its cavity rubbed with iodoform. The instruments should be treated by boiling, and then kept in cooled boiled water or a three per cent. solution of carbolic acid. Everything being in readiness, an incision is made directly over the appendix region and abscess cavity. The incision should be from four to six inches in length. It should extend from an inch above the middle of Roupart's ligament upward through the right linea semilunaris, and be made to penetrate until peritonaeum, caecum, or pus is reached. Haemorrhage should be arrested by the application of hot water and haemostatic forceps. Having reached pus, we may get a clearer view of the appendix and its surroundings by irrigating the parts with recently boiled or distilled water at a temperature of 105° to 110° F.

We may now enlarge the wound, if deemed necessary, to make the required manipulations. Having discovered the appendix to be diseased, and the cause of the trouble, we remove it, after gently freeing it

from any adhesions which may have formed, by ligating it close to its caecal attachment with a silk ligature and excising it just outside the point of ligation. If the peritonaeal cavity has not been involved, either by the abscess, or by the necessary manipulations required in removing the appendix, the abscess cavity is simply washed out with a mercuric bichloride solution (1 to 1,000) and a good sized rubber drainage-tube carried to the bottom of the cavity and brought out at the most dependent part of the wound. If the general peritonaeal cavity has been invaded by pus, then every part of the abdominal cavity should be thoroughly douched and cleansed with sterilised water at a temperature of 105°–110° F., and in addition, another drainage-tube of large size, preferably of glass, perforated and slightly curved, is carrried down between the coils of intestines to the most dependent part of the pelvic cavity and brought out at the lower part of the wound. The wound is then brought together with interrupted silk sutures. A piece of protective tissue is now applied over the wound after making an opening through it for the drainage-tube or tubes. A cotton rope is carried to the bottom of the glass tube which absorbs the secretions, and over the opening a wad of cotton is placed and enveloped in rubber tissue. Iodoform is now dusted over the wound and surroundings, and a large dressing of wet bichlorid gauze and cotton is applied and retained in place by a four-tailed flannel binder. The dressings should be changed as often as they become soiled, which usually occurs every six or seven hours at first, afterwards at longer intervals. The glass pelvic drain must be kept in place until the 6th or 8th day, or until the secretions are of such a character and amount that it will be safe to remove it. It might be necessary to keep it in much longer. As a rule, one or two sutures must be cut at the end of the first twenty-four hours; others, afterwards, as tension may demand. The gaping wound will then need to be packed with gauze and frequently changed, after first cleansing the parts with hydrogen peroxide, until the tubes are taken away and granulations approach the surface. Now adhesive straps may be used to approximate the wound edges.

Dr. Hough's paper was discussed by Drs. Jacobson, Douglas, Higgins, Hills, and Bennett.

The following letter was then read and accepted:

BINGHAMTON, N. Y.
June 18, 1891.

MR. PRESIDENT: At the last session of this Association, I offered, as a prize, a complete set of the "Medical and Surgical History of the War," in six volumes, for the best short essay on some subject connected with popular sanitation.

I am sorry to report that there has been no competition for this prize, only one essay having been received. I should have been glad to make the

award to the author of this most commendable essay, but it would lack the compliment of competition, and so I have forwarded it to the State Association, to compete for the prize of $100, which I offered for the best essay on subjects of practical sanitation, to be presented at the next annual meeting in New York city.

I desire now to renew my offer of last year, namely, a complete set of the "Medical and Surgical History of the War," in six volumes, for the best short essay on some subject connected with popular sanitation.

The conditions involved in this offer are the following:

1. Competition will be confined to the Fellows of the Third District Branch.

2. Essays should be forwarded to my address not later than the 1st of April, 1892, accompanied by the name of the author under separate seal.

3. A committee of examination and award will be selected from the profession outside of the limits of the Third District Branch.

4. The successful essay will be read at the next annual meeting of this Association, and, if approved, will be offered for publication in the secular press.

Very respectfully,

J. G. Orton, M. D.

J. G. Orton, M. D.—Public Bath-Houses.—I had the honour, at the last meeting of this Association, and again at the annual session of the State Association, to bring forward a plan for the popularisation of sanitary science. It has afforded me much pleasure to witness the cordiality with which the proposition has been received by the medical profession, not only of this state, but by many and remote parts of the country.

It becomes my duty as a member of the State Committee on Hygiene and Public Health, to present for your consideration and approval some practical question pertaining to popular sanitary science.

From the series of subjects which it is proposed to bring forward from time to time, I have selected for this occasion a short paper on "Public Bath-Houses."

Every intelligent layman knows, as well as the physician, that personal cleanliness is an important element in the preservation of health, and the history of the human race in all ages and countries has fully demonstrated its recognition as a potent agency in the prevention of disease and the prolongation of life.

It is passing strange, in these latter days of the nineteenth century, with all our boasted prominence in civilisation and advancement in science, art, literature, and political economy, that we should be put to shame by comparison with the nations of ancient times, and even with the so called barbarians, in the matter of provision for bathing facilities for all classes.

Every student of history has recognised the conveniences, luxuries, and even artistic embellishments of the numerous public baths of the ancient Greeks and Romans. The magnificence of many of these baths, especially of the Romans, and their sumptuous arrangements, were such that even a writer like Seneca is quite lost in his description of them. He says, "To such a pitch of luxury have we reached that we are dissatisfied if we do not tread on gems in our baths." Our modern conception of bath-houses is somewhat bewildered when we read, for example, of the baths of Diocletian containing 3,200 marble seats for the use of the bathers; that the halls were crowded with magnificent columns, and were ornamented with the finest pieces of statuary; that the walls were covered with exquisite mosaics that imitated the art of the painter in their elegance of design and variety of colour. The Egyptian syenite was encrusted with the precious green marbles of Numidia. The rooms contained the works of Phidias and Praxiteles. A perpetual stream of water was poured into capacious basins through the wide mouths of lions of bright and polished silver; water issued from silver and was received on silver.

Notwithstanding all this elegance and extravagance in the erection of public baths, they were nearly or quite free to every citizen, and their number was evidently sufficient for the ample accommodation of all, for we read that at the time of Constantine's removal to Byzantium, Rome boasted of 856 public baths, using 400,000,000 gallons of water supplied by miles of aqueducts; and during the administration of Vipsanius Agrippa, with all his multiplied duties as chief general of Octavianus, he found time to erect 170 public baths entirely free to the poor, and maintained them after his death by bequests of funds for that purpose.

At the present day, in nearly every country in Europe, Asia, Africa, and in Japan, bathing facilities for every one are abundantly afforded. But in the United States, with all our philanthropic efforts to ameliorate the condition of the poor, we have certainly ignored the lessons of modern hygiene that cleanliness of the body is a great panacea for the prevention of disease and from untimely death.

It will require no arguments to prove to us that the establishment of suitable public bath-houses, at least in every city having water facilities, would not only be a wise provision and an economical expenditure of money, but would secure at once for those communities a mighty safeguard against the ravages of disease, lowering the death-rate, and giving an enviable reputation for healthfulness and longevity of the inhabitants. While it is certainly the duty of the medical profession to inculcate the lessons of hygiene as a part of their obligations to those they serve, it is also eminently proper that they should strive to create a wise public sentiment in the community in which they live, to the end that the constituted authorities should be spurred to their duty in making provision for

the protection of the people against the preventable causes of disease and of premature death, by affording sufficient and cheap facilities for cleanliness of the body by the use of the public bath.

It is just as incongruous to say to that portion of our population which earns its honest daily bread by the sweat of its brow, "Wash and be clean," without providing opportunities, as to say to the careworn, ragged, decrepit beggar asking for alms, "Be ye warmed and clothed and fed," and slam the door in his face.

I am informed at the office of the water commissioners of this city that there are about 1,000 bath-tubs in use in our private and public houses. According to the estimated average of five persons to each family, we find that provision is thus made for the bathing of about 5,000 of our 60,000 population. But what of the residue of this unwashed multitude of humanity? Practically no provision whatever is made for them. Doubtless many improvise some kind of a bath (at least we will hope so), and yet there must be thousands who go unwashed and unclean for weeks and months, perhaps for years.

The practical question arises, Is there anything that can be done, and done at once, to remedy this evil? Thanks to the inventive genius of these closing years of the nineteenth century, we can answer this inquiry in the affirmative. The plan suggested by David Grove, of Berlin, in 1883, was first adopted for a public bath in Vienna in 1887, and since successfully introduced into many cities in Europe, and, finally, during the past year, into New York city.

The plan is simply to utilise water for bathing purposes in the form of a shower or rain bath; and the contrivance is so simple and automatic, and withal so cheap, that no community is so poor that it cannot afford to have one or more of the public baths erected for the accommodation of the labouring classes and those unable to provide themselves with bathing facilities.

Some of the advantages of the rain baths are,—

First. They can be located wherever they are most needed, either in the factory, the school-house, or in the populous districts of the poor.

Second. They can be erected at a trifling cost compared with the tub, plunge, or swimming baths, and the expense of maintenance is small.

Third. They can be used throughout the year, in all kinds of weather, and the temperature of the water and rooms accurately adapted to the changes of the atmospheric conditions.

Fourth. There is great economy in the use of water, five gallons being amply sufficient for a bath, while all others require much larger quantities.

Fifth. There is no possibility of communicating disease, and not a particle of impure or contagious matter can be left in the bath-room proper, and the cleansing of the body is much more thorough.

Sixth. The rain bath stimulates the skin, and thus provides protection against subsequent exposure, while the tub bath is relaxing, and requires more care to avoid ill results.

It is entirely unnecessary for me to go into any detailed description of the most approved construction of these or any other modern public bath-houses. That is the province of architects and builders. I desire simply at this time to call the attention of this Association and the community to the recent plans which have been so successfully inaugurated in Europe, and very lately in this country, for providing efficient bathing facilities for all classes, and at a merely nominal expense.

If there be any one thing of which the medical profession may be justly proud at the present day, it is preventive medicine. Modern hygiene has shown most clearly that the fundamental principle of sanitation is cleanliness, and hence, by the public and private enforcement of this virtue, much suffering, disease, and death may be banished from the land.

The Nominating Committee then reported, through its chairman, Dr. C. L. Squire, that they would recommend the next annual meeting to be held at Owego, that Dr. W. L. Ayer be made Secretary, and that the following constitute the Executive Committee:

Broome,	J. H. Chittenden, Binghamton.
Cayuga,	J. D. Tripp, Auburn.
Chemung,	T. A. Wales, Elmira.
Chenango,	H. C. Lyman, Sherburne.
Cortland,	F. W. Higgins, Cortland.
Delaware,	W. B. Morrow, Walton.
Madison,	. . . . .
Onondaga,	H. D. Didama, Syracuse.
Otsego,	B. A. Church, Oneonta.
Schuyler,	B. T. Smelzer, Havana.
Seneca,	Elias Lester, Seneca Falls.
Tioga,	W. L. Ayer, Owego.
Tompkins,	William Fitch, Dryden.

The report was adopted, and the meeting then adjourned.

J. D. TRIPP, *President.*
F. W. PUTNAM, *Secretary.*

PROCEEDINGS OF THE EXECUTIVE COMMITTEE OF THE THIRD DISTRICT BRANCH.

The meeting was called to order by the Secretary, at the office of Dr. W. A. Moore, on the evening of June 17, 1891.

Present—Drs. W. A. Moore, William Fitch, C. W. Greene, and F. W. Putnam.

Dr. W. A. Moore was selected as chairman, and Dr. C. W. Greene was appointed a member of the committee *pro tem.*

The following committees were appointed for the annual meeting:

Reception—Drs. J. G. Orton, C. B. Richards, and J. H. Chittenden.

Registration—Drs. C. W. Greene, W. L. Ayer, and L. J. Brooks.

Business—Drs. N. Jacobson, H. O. Jewett, and F. W. Ross.

Dr. C. W. Greene moved an assessment of one dollar on each member in attendance at the annual meeting, to defray the expenses of the Branch, and the motion was seconded and carried.

On motion of Dr. Greene, the bills of the Secretary, for printing, stationery, postage, etc., were audited and approved.

On motion of the Secretary, it was decided to refer the appointment of a new secretary and the next place of meeting to the general meeting of the Branch.

Adjourned.

F. W. PUTNAM, *Secretary.*

FOURTH DISTRICT BRANCH.

The seventh annual meeting was held at the Genesee Valley Club, Rochester, May 12, 1891.

The meeting was called to order, at 11 o'clock a. m., by the President, Dr. R. J. Menzie, of Caledonia.

The minutes of the previous meeting were read and approved.

The President stated that his manuscript had inadvertently been left at home, hence the President's annual address was omitted.

Upon motion of the Secretary, it was voted that a committee be appointed of one member from each county, excepting Erie county, which should have two, who should have charge of the scientific programme for the next meeting.

Dr. R. M. Moore reported for the Committee of Arrangements that a lunch would be served in the adjoining room at the close of the morning session.

Dr. M. W. Townsend announced the death of Dr. Wm. B. Sprague since the last meeting of the Branch.

The following Nominating Committee was appointed:

Dr. N. G. Richmond, Chautauqua.
Dr. H. D. Ingraham, Erie.
Dr. F. L. Stone, Genesee.
Dr. F. H. Moyer, Livingston.
Dr. J. D. Dunning, Monroe.
Dr. J. H. Taylor, Orleans.
Dr. J. Dunn, Steuben.
Dr. Darwin Colvin, Wayne.
Dr. A. G. Ellinwood, Wyoming.

The first paper presented to the Association was entitled "Ectopic Gestation," by Dr. M. W. Townsend, of Genesee county. Discussed by Drs. Ingraham and Richmond.

A paper on "Noma following Measles," was presented by Dr. D. J. Chittenden, of Steuben county. Discussed by Drs. Hubbell and Ingraham and the author.

A paper on "The Purse String or Tobacco Pouch Operation for Cystocele, with Report of Cases," was presented by Dr. H. D. Ingraham, of Erie county.

The Nominating Committee reported in favour of the election of the following members of the Executive Committee for the ensuing year:

Dr. Jas. A. Stephenson, Allegany.
Dr. S. J. Mudge, Cattaraugus.
Dr. N. G. Richmond, Chautauqua.
Dr. H. D. Ingraham, Erie.
Dr. F. H. Moyer, Livingston.
Dr. M. W. Townsend, Genesee.
Dr. R. M. Moore, Monroe.
Dr. S. T. Clark, Niagara.
Dr. F. D. Vanderhoof, Ontario.
Dr. John H. Taylor, Orleans.
Dr. Jeremiah Dunn, Steuben.
Dr. A. G. Ellinwood, Wyoming.
Dr. Wm. Oliver, Yates.
Dr. Darwin Colvin, Wayne.

Upon motion of the Secretary, the report of the Nominating Committee was received and adopted.

The meeting was then adjourned until 1:45 p. m., and the members partook of a luncheon provided by Drs. E. M. Moore, Jr., and R. M. Moore.

The afternoon session was called to order by the President at 2 o'clock p. m.

The following papers were presented:

"Affections of Sight from Injuries," by Dr. Alvin A. Hubbell, of Erie. Discussed by Drs. Rider and Goler, of Rochester.

"A New Mode of Making Extension and Counter-Extension in the Application of the Plaster Jacket for Curvature of the Spine," by Dr. Jeremiah Dunn, of Steuben. Discussed by Dr. E. M. Moore, Jr., of Rochester.

"Vesico-Urethral Fissure in Women," by Dr. G. W. Goler, of Monroe. Discussed by Dr. E. M. Moore, Jr., of Rochester.

The Treasurer presented his annual report, showing receipts of $57.73. Expenses, $17.10. Balance, $40.63. He recommended that there be no assessment levied for this year. The report of the Treasurer was adopted.

The President appointed the following Committee on Scientific Programme for the ensuing year:

Allegany County, Dr. A. W. Cottrell.
Cattaraugus County, Dr. V. A. Ellsworth.
Chautauqua County, Dr. T. D. Strong.
Erie County, Drs. A. A. Hubbell and Jas. W. Putnam.

Genesee County, Dr. F. L. Stone.
Livingston County, R. J. Menzie.
Monroe County, Dr. G. W. Goler.
Niagara County, Dr. Wm. Q. Huggins.
Ontario County, Dr. Jas. H. Allen.
Orleans County, Dr. H. C. Tompkins.
Steuben County, Dr. D. J. Chittenden.
Wayne County, Dr. J. N. Arnold.
Wyoming County, Dr. Z. J. Lusk.
Yates County, Dr. William Oliver.

The President congratulated the meeting upon the interesting papers and discussions which had been presented, and declared the meeting adjourned.

R. J. MENZIE, *President.*
W. H. THORNTON, *Secretary.*

FIFTH DISTRICT BRANCH.

The seventh annual meeting of this Branch was held at 315 Washington street, Brooklyn, on Tuesday, May 26, 1891. The morning session was called to order by the President, Dr. Stephen Smith, at 11:30 a. m.

The Secretary read the minutes of the last annual and last special meetings, which were approved as read.

The report of the Committee of Arrangements was read and approved, and, upon motion of Dr. P. B. Porter, a vote of thanks was extended to the committee for their efforts in behalf of the Branch.

The President here announced that he had appointed Drs. H. Van Hoevenberg and N. W. Leighton to act with the Secretary as Registration Committee.

The next order of business was the President's address, but the Secretary moved that the by-laws be suspended as to the order of business; so that the reading of the President's address, now in order, shall be postponed until after the transaction of the business of the Branch, and to come immediately before Dr. Dudley's paper, whenever read, as the subjects are allied. Carried unanimously.

There were no reports of delegates.

There was no formal report of the Executive Committee this year, but the Secretary read last year's minutes, as required by the by-laws, which were approved.

Dr. W. G. Russell, who had been appointed by the Executive Committee to audit the Treasurer's accounts, here returned the cash-book and vouchers in his possession, stating that he had found them correct.

The annual report of the Treasurer was then read, and, on motion, was ordered on file.

Reports of special committees were in order. The only one this year was the Standing Committee on Necrology. The Secretary made the official announcement, as reported in the minutes of the Executive Committee.

There was no Unfinished Business.

Under the head of New Business, the Secretary stated that he had received the official programme for the seventh annual meeting of the Fourth District Branch, to be held in Rochester, on May 12 last. There were seven interesting papers to be read.

The biographical sketches were then taken up. The Secretary read the following three sketches:

On the late Dr. James Bathgate, by John Shrady, M. D.
On the late Dr. W. N. Blakeman, by Mr. A. N. Blakeman.
On the late Dr. John P. Garrish, by W. T. White, M. D.

As Dr. A. Palmer Dudley had not yet made his appearance to read his paper, the President's address was still further postponed until the opening of the afternoon session.

Dr. Samuel E. Milliken then read his paper on "The Treatment of Hydrocele by Carbolic Injection *versus* the Radical Operation." (Published in *Annals of Surgery*, Vol. XIV, p. 292.)

Discussed by Drs. Ballou, W. T. White, Barnes, Murphy, Govan, the chair, and closed by the author.

The President next called on Dr. Wm. R. Ballou to read his paper, which was down for the afternoon session, on "Acute Prostatitis and Prostatic Abscess." (Published in *N. Y. Med. Jour.*, Vol. LIV, p. 99.)

Discussed by Drs. W. T. White, Milliken, J. D. Sullivan, Pritchard, McCollom, Steinke, de Quesada, the chair, Dr. Willard Parker Beach (a delegate), and closed by the author.

The President then announced that the Branch would proceed to appoint a Nominating Committee for the choice of an Executive Committee for the ensuing year. The Secretary then called off each county of the district in alphabetical order, and the Fellows present from each county named the Fellow to represent the county on the following

Nominating Committee:

Dutchess County,	Dr. Edwin Barnes.
Kings County,	Dr. R. M. Wyckoff.
New York County,	Dr. W. T. White.
Orange County,	Dr. M. C. Conner.
Putnam County,	None present.
Queens County,	" "
Richmond County,	" "
Rockland County,	Dr. Wm. Govan.
Suffolk County,	Dr. W. D. Woodend.
Sullivan County,	None present.
Ulster County,	Dr. H. Van Hoevenberg.
Westchester County,	None present.

This committee was requested to meet during the coming intermission.

Adjourned for lunch at 1 :05 p. m.

The afternoon session was called to order by the President at 2 : 10 p. m.

As the President's address was now in order, Dr. Wm. McCollom was called to the chair.

The President then delivered his address on "Opiates in the Treat-

ment of Acute Peritonitis." (Published in *N. Y. Medical Record*, Vol. XXXIX, page 613, and in *Philadelphia Medical News*, Vol. LVIII, page 597.)

Discussed by Drs. Carroll, Gouley, Manley, S. J. Murray, J. D. Sullivan, the chair, and closed by the President.

Dr. A. Palmer Dudley was not present to read his paper, which advocated Cathartics, and regrets were expressed that full scope could not be given to the discussion of the subject, as this side of the question had not been heard. Dr. Gouley therefore made the following motion:

In consideration of the importance and interest of the subject of "Opiates in Peritonitis," and the lack of the opportunity at this time to do full justice to its discussion, be it

Resolved, That this Fifth District Branch request the Committee of Arrangements for the approaching annual meeting of the State Association to make this whole subject take the place of the discussion on Obstetrics for this year.

Carried unanimously.

Dr. E. G. Rave's paper was next in order, but as Dr. Rave was not present, Dr. H. W. Mitchell read his paper on "Practical Results of the Operation for Lacerated Cervix Uteri." (Published in *N. Y. Med. Record*, Vol. XXXIX, page 705.)

He presented to the meeting, for examination, an improved speculum with wings from each side to keep the lips of the vulva apart while examination and operation were going on. There was no discussion.

Dr. T. J. McGillicuddy then read his paper on "Objections to Ordinary Axis-traction Instruments, also the Advantages of the Use of the Anticraniotomy Forceps over Version in Pelvic Deformities." (Published in *Jour. Am. Med. Ass.*, Vol. XVII, p. 221.)

Improved instruments were shown, including the instrument which Dr. McGillicuddy has called the Anticraniotomy Forceps, and with which he has met with such gratifying success.

Discussed by Dr. J. D. Sullivan.

Dr. Reginald H. Sayre then read his account of "A Case of Obstinate Neuralgia following Fracture Relieved by Operation." (Published in *N. Y. Medical Journal*, Vol. LIV, p. 206.)

There was no discussion.

The report of the Nominating Committee was next called for. They reported that they had organised, with Dr. W. T. White as chairman and Dr. H. Van Hoevenberg as Secretary, and offered the following:

For member of the Executive Committee, to represent

Dutchess County,	Dr. I. D. LeRoy.
Kings County,	Dr. W. G. Russell.
New York County,	Dr. W. T. White.
Orange County,	Dr. M. C. Conner.
Putnam County,	Dr. G. W. Murdock.

Queens County,	Dr. E. G. Rave.
Richmond County,	Dr. F. U. Johnston.
Rockland County,	Dr. Wm. Govan.
Suffolk County,	Dr. W. D. Woodend.
Sullivan County,	Dr. C. W. Piper.
Ulster County,	Dr. H. Van Hoevenberg.
Westchester County,	Dr. R. B. Coutant.

It was moved, seconded, and carried that the report be accepted and approved, and the committee discharged.

After the President had called for a meeting of this new Executive Committee for immediately after adjournment, on motion, the meeting adjourned at 4:20 p. m., to meet next for the eighth annual meeting in Brooklyn, one year from this date.

The Register showed forty Fellows, six delegates from the Kings County Medical Association, and three invited guests present.

STEPHEN SMITH, *President.*
E. H. SQUIBB, *Secretary.*

PROCEEDINGS OF THE EXECUTIVE COMMITTEE OF THE FIFTH DISTRICT BRANCH.

A called meeting of the Executive Committee was held at 315 Washington street, Brooklyn, on Tuesday, May 26, 1891. Called to order by the President, Dr. Stephen Smith, at 10:15 a. m.

Present:

Dr. Stephen Smith.
Dr. Wm. Govan.
Dr. W. G. Russell.
Dr. H. Van Hoevenberg.
Dr. W. D. Woodend.
Dr. E. H. Squibb.

The Secretary read the minutes of the last meeting, which were approved.

The report of the Committee of Arrangements for this meeting was presented, as follows:

Report of the Committee of Arrangements for the Annual Meeting, 1891.

The undersigned Committee of Arrangements respectfully submit the following report:

The favourable experience of last year in the use of the upper lodge rooms in Wurzler's building, 315 Washington street, has led your com-

mittee to select the same suite of rooms for this present meeting, for the same sum, $10.

The income from our Permanent Fund enables us this year to take a step a little further in advance by spending $50 on a substantial lunch, and the satisfaction given us last year by Mr. P. Maresi, as caterer, has influenced your committee to ask his services for this meeting.

The hour of 11 a. m. has been decided upon for opening the morning session.

Respectfully submitted:

J. D. RUSHMORE, M. D., *Chairman.*
J. C. BIERWIRTH, M. D.
T. M. LLOYD, M. D.
N. W. LEIGHTON, M. D.
WILLIAM McCOLLOM, M. D.
STEPHEN SMITH, M. D., } *Ex officio.*
E. H. SQUIBB, M. D. }

On motion, the report was ordered on file.

The Secretary here gave the result of the circular vote of the Executive Committee for the above Committee of Arrangements as thirteen in the affirmative (one member being abroad).

The President stated that he would appoint two Fellows to act with the Secretary as Registration Committee, later in the day.

The Secretary made the following report on deceased Fellows:

The Secretary regrets to have to announce officially that since the last annual meeting of this Branch there have been three deaths among the Fellows of our district, all Original Fellows,—Drs. W. N. Blakeman, James Bathgate, and John P. Garrish, of New York city.

The Treasurer then read his annual statement.

TREASURER'S ANNUAL STATEMENT, MAY 27, 1890, TO MAY 25, 1891.

Fifth District Branch New York State Medical Association, with E. H. Squibb, Treasurer.

To balance cash, as per statement May 27, 1890,	$56.26	
Assessments collected,	61.00	
Interest collected,	56.45	
		$173.71
By rent of rooms for Sixth Annual Meeting,	$10.00	
By catering for Sixth Annual Meeting,	40.00	
By postage,	14.50	
By printing,	12.15	
Balance, cash on hand,	97.06	
		$173.71

PERMANENT FUND ACCOUNT.

To total amount of fund, as per statement May 27, 1890,	$910.00	
To contributions to fund to date,	90.00	
		$1,000.00

By investment in railroad bonds (5 % interest), . . $830.00
Balance on hand, ... 170.00
$1,000.00

The cash book and vouchers were presented for verification, and the President appointed Dr. W. G. Russell to audit the accounts and report later in the day.

The time and place for the next meeting was next brought up. Upon explanation being made that no suggestion of a place for a special meeting had been offered, nor any call or request from any of the committee for such a meeting this year had been made, it was resolved that the next meeting be the eighth annual meeting, to be held in Brooklyn, on Tuesday, May 24th (4th Tuesday), 1892, as provided for by the by-laws.

Under the head of Unfinished Business, the Secretary read the resignations of Drs. Wm. Detmold and Wm. Young, which had been accepted according to the by-laws.

The Secretary stated here that as there had not been an Executive Committee meeting to appoint a Secretary for the year just closing, he had presumed to hold over.

Under the head of New Business, the names of the following delegates from the Kings County Medical Association were read:

Dr. T. C. Burnett.
Dr. R. H. Sullivan.
Dr. J. E. Richardson.
Dr. E. T. Jones.
Dr. E. Reynolds.
Dr. A. Boyce Marion.
Dr. A. Wieber.
Dr. Willard Parker Beach.

On motion, a hearty welcome was extended to these gentlemen, and they were invited to full privileges of the floor.

Upon asking for instructions for the ensuing year, the Secretary was directed to pursue the same policy in regard to the publication of the papers offered to the Branch that held during the past year.

On motion, the Treasurer was authorised to make the assessment for the ensuing year $1, as last year, and that slips be appended to each bill inviting the Fellows to join in the Permanent Fund, voluntarily, as before.

The Secretary moved that the five Fellows who had recently joined the Association be exempted from assessment for the ensuing year. So ordered.

The Secretary was directed to act, as heretofore, as the Committee on Necrology, and to hold such office until otherwise ordered.

The Executive Committee had no special report to offer to the general meeting this year, but simply directed that last year's minutes be read.

After a few minutes allowed for any members to bring up any business, a motion being made to adjourn, the President declared the meeting adjourned, at 10:50 a. m.

E. H. SQUIBB, *Secretary.*

The called meeting of the newly elected Executive Committee was held at 315 Washington street, Brooklyn, on Tuesday, May 26th, 1891, immediately after the Branch annual meeting. Called to order by the President, Dr. Stephen Smith.

Present: Drs. Stephen Smith, W. G. Russell, I. D. LeRoy, M. C. Conner, H. Van Hoevenberg, E. H. Squibb.

It was stated that the by-laws called for this meeting to elect a Secretary for the ensuing year. On motion, then, E. H. Squibb was reëlected.

Adjourned.

E. H. SQUIBB, *Secretary.*

NEW YORK COUNTY MEDICAL ASSOCIATION.

ANNUAL REPORT.

In committing to paper this *résume* of the proceedings of our meetings, the writer complies with an existing custom.

The State Association desires to incorporate with the volume of its own transactions a report from the Association of its most populous county. In compliance with that desire this report is respectfully presented. In monthly gatherings from October to June we have listened to the reading of well prepared papers and to incidental discussions, which we regard as valuable additions to our stock of knowledge and as useful aids in our busy work.

On October 20, 1890, the subject of "Skin Diseases" was presented by Dr. L. DUNCAN BULKLEY in a paper on "Lichen Planus," which was discussed by Drs. A. R. Robinson and I. P. Oberndorfer. On "Surgery," Dr. VANDERHOOF read a paper on "The Management of Fractures." Discussion thereon was by Drs. J. D. Bryant and S. T. Armstrong.

On June 15, 1891, Dr. T. H. MANLEY presented a paper on "Resection as a Substitute for Primary Amputation." This was discussed by Drs. Quigley, of Jersey City, and Wile, of Danbury, Conn.

On November 17, 1890, the subject of "The Medical and Surgical Aspects of Appendicitis, Typhlitis, and Perityphlitis" was presented in a paper by Dr. J. LEWIS SMITH, and treated by him in a full and exhaustive manner. The participants in the discussion were Drs. Janeway, McBurney, Leale, and Oberndorfer.

On December 15, 1890, Dr. ROBERT NEWMAN, in a paper entitled "Demonstration of the Modus Operandi in the Treatment of Urethral Stricture by Electrolysis," stated his views, and illustrated them by the application of electricity to bony and soft tissues. Discussion by Drs. Boldt and Vanderhoof.

On February 16, 1891, a letter was read from Dr. HENRY B. DOUGLAS, then a resident of Berlin. It conveyed a description of Koch's methods, and afforded us an opportunity of hearing from one of our own members an original description of this subject then engaging so much public attention. At the same meeting, as a contribution to "Diseases of the Ear," a paper was read by Dr. VON B. THOMPSON on "Perforation of the Membrana Tympani." Drs. Hepburn, Claiborne, and Oppenheimer discussed this paper.

On April 20, 1891, Dr. MATHIAS L. FOSTER read a description of a case of "Traumatic Occlusion of the External Auditory Meatus," which he described as unique. Discussed by Dr. H. S. Oppenheimer.

The principal medical subjects of this year were presented in two papers, one on March 16, 1891, by Dr. J. H. TYNDALE, and the other on May 18, by Dr. J. LEWIS SMITH.

The subject of Dr. TYNDALE'S dissertation was "Treatment of the Various Forms of Pulmonary Consumption with Vaccine Lymph." His views were advanced as the result of much observation and experiment, and as proof of their verity he presented several living subjects, with the history of each case, that all present might judge of the value of his treatment. One of his concluding declarations was, that whether current trials proved valuable or not, it was becoming more and more probable that the *introduction of some animal or chemical poison into the system would be the means of curing tuberculosis, and perhaps other forms of diseased conditions resembling it.* The subject excited considerable discussion, during the course of which the idea was suggested that perhaps the experiments of Bock against syphilis, Pasteur against hydrophobia, Koch against tuberculosis, and Jenner against variola might bear on the same line of investigation.

On motion, the President was authorised to appoint a commission of five members to consider the subject and report to the Association. At a subsequent meeting, Drs. Seaman, Leaming, Leale, J. Lewis Smith, and Gibier were so appointed.

The other paper was by Dr. SMITH, on the subject of "Recent Improvements in the Treatment of Diphtheria." This, too, enlisted careful attention. Its experienced author recommended lines of treatment, and assigned with care to each its proper value. The paper was discussed by Drs. George E. Hubbard, Fischer, Meding, Bleyer, and by S. G. Cook, who advocated the use of biniodide of mercury, and described in detail the disease as it had been seen by him, and the cogent reasons for his positive views in regard to its effective treatment.

In the department of "Gynaecology," Dr. EDWARD SANDERS, on June 15, read a paper on "Chronic Induration following Pelvic Cellulitis in the Female, with its Treatment by Galvanism." This paper commended itself to general attention by its lucid presentation, the number of cases referred to, the unusual success of treatment, the exactness with which Dr. Sanders noted the number of cells that he used in different cases, and the various reasons for increasing or decreasing their number. It was discussed by Drs. Dudley, Truax, Boldt, and others, and was recognised by all present as a valuable contribution to our scientific work.

As a contribution to "Public Health," Dr. E. F. BRUSH, at our meet-

ing in March, read a paper on "Sterilised Milk," describing the reasons for its more extensive use among children, and the difference between the infant and the adult requiring its employment in one case and not in the other. Dr. Gibier discussed the paper, and, after Dr. Brush had answered questions propounded by various members, closed the discussion.

"Other Science Applied to Medicine" was admirably presented, April 20, 1891, by Dr. J. Mount Bleyer, in a paper entitled "The Phonograph and Micro-Graphophone in Medical and Other Sciences."

Dr. Bleyer had kindly brought the many instruments required to illustrate his subject, and demonstrated to the large audience assembled the wonders of the phonograph and micro-graphophone, showing how the voice could be retained and discharged at pleasure by and from the instrument, and how the various tones of voice and sounds of cough could be presented so as to contribute to accurate diagnosis of diseased conditions of the nose, larynx, and lungs. Dr. Bleyer also described the possibilities of its application to heart sounds, friction sounds, and all the varieties of râles and coughs. To those who had not been familiar with the workings of the phonograph, or with its application, this opportunity of thoroughly understanding it was gratefully acknowledged, and the desire expressed for a repetition of the interesting paper when new experiments, now on trial, should be completed.

At the meeting in May, Dr. McGillicuddy presented a paper on the "Human Mammae and their Anomalies." Photographic illustrations accompanied his oral descriptions, and the number of cases he had collected was indeed a matter of surprise. It might be said that this subject was more curious than useful; but the exhibition of these photographs could not fail to prove that there were many cases requiring the attention of the physician or surgeon to relieve the inconveniences due to these erratic mammae.

In this description of scientific work the attempt is made to classify by subjects rather than by time. Thus we have had papers on "Skin Diseases," "Surgery," "Diseases of the Ear," "Practice of Medicine," "Gynaecology," "Public Health," "Other Sciences Applied to Medicine in the Interest of Diagnosis," and "Pathology" illustrated by the various specimens exhibited at almost every meeting.

We recognise scientific work as the most important part of our transactions. Nevertheless we have not been unmindful of our other obligations to the profession at large. All our members have rejoiced in the increased circulation of the *Journal of the American Medical Association*, and have taken a lively interest in the proposal for its removal from Chicago to Washington, D. C. At the meeting in March, Dr. Armstrong introduced a resolution disapproving of the removal. This was amended at a subsequent meeting in such a manner as to leave it to our

delegates to Washington to determine in regard to the matter. At a subsequent meeting a resolution offered by Dr. Newman was adopted, entering a protest against the appointment of Dr. Potter, of Buffalo, as a trustee of the Journal, on the ground of his connection with a society not in affiliation with the American Medical Association. Drs. Newman, Purple, and Thompson were appointed to draw up the protest, which was adopted, signed by the president and corresponding secretary, and transmitted to the Judicial Council. An answer was received from Chicago acknowledging its receipt, denying some of its statements, and promising to see to its consideration when the Judicial Council should assemble. No further action has been formally taken.

The meeting in January is devoted to the election of officers and the presentation of annual reports. At that meeting the following persons were elected:

President—S. B. W. McLeod, M. D.
Vice-President—Wm. T. White, M. D.
Corresponding Secretary—Augustus D. Ruggles, M. D.
Recording Secretary—P. Brynberg Porter, M. D.
Treasurer—John H. Hinton, M. D.
Members of Executive Committee elected—Edward Sanders, M. D., Neil J. Hepburn, M. D., Wm. B. De Garmo, M. D., Geo. T. Harrison, M. D.

At the February meeting, Dr. Geo. T. Harrison delivered an address as retiring president. He eloquently advocated the formation of medical associations, and spoke of their usefulness, especially to the younger members of the profession. The address was mainly devoted to a consideration of the value and desirability of the more general study of the medical literature of the past. At the close of his address he courteously introduced his successor. This was followed by an address by the President-elect, Dr. S. B. W. McLeod, in which he thanked the Association for the honour conferred, advocated a more intimate relation between the state and county associations, bespoke the influence of members present to increase our number, and their kindly coöperation in the administration of new duties.

It is pleasing to report that our Association continues to prosper, that the meetings are large and harmonious, and that the social element continues to be observed at the collation served after each monthly meeting. After that of June, while still at the table, the President rapped for order, and, calling attention to the fact of this being the last gathering before the close of summer, proposed a sentiment which received a hearty response. Pleasantries and kindly suggestions followed, and short speeches by Drs. Dudley, Shrady, Hinton, Ruggles, Harrison, and Truax contributed to the pleasure of the evening, and at a late hour the meeting adjourned.

This report would indeed be incomplete without a reference to those of our number who have during the past year departed to the other world. Twelve deaths have been recorded. Youth, manhood, and old age are represented on the list. Drs. Bathgate, Garrish, Gordon, McTammany, Sheedy, Phillips, Steinert, Matthews, Jones, Wells, Keeler, and Du Bois are still remembered as familiar names. Pleasant memories of departed friends stimulate survivors to imitate their example, and the closing sentences of this report cannot be better framed than by words of honour for our dead.

S. B. W. McLEOD, *President.*

PROCEEDINGS.

EIGHTH ANNUAL MEETING

OF THE

NEW YORK STATE MEDICAL ASSOCIATION,

HELD AT THE MOTT MEMORIAL HALL, 64 MADISON AVENUE, NEW YORK CITY, OCT. 28, 29, and 30, 1891.

FIRST DAY, WEDNESDAY, OCTOBER 28.
MORNING SESSION.

The meeting was called to order at 10 a. m. by the PRESIDENT, Dr. STEPHEN SMITH, of New York county.

The report of the Committee of Arrangements was presented by the Chairman, Dr. JOHN G. TRUAX, and, upon motion, the report was accepted and adopted.

The SECRETARY then moved the postponement of the PRESIDENT'S address until after the routine business had been transacted. Carried.

The annual report of the Council was read by the Secretary. In this report was embodied the report of the Committee on the Revision of the Constitution and By-Laws. Each article was read and acted upon separately by the Association, and then, upon motion, the amendments to the by-laws and constitution were adopted as a whole. The report of the Council was then accepted and adopted.

Upon motion, a committee on the TREASURER'S accounts was authorised to be appointed by the PRESIDENT.

AFTERNOON SESSION.

The meeting was called to order by the PRESIDENT.

Upon motion of Dr. S. T. HUBBARD, of New York county, the follow-

ing committee was appointed to draft resolutions upon the death of Dr. Abram Du Bois:

Dr. S. T. Hubbard,
Dr. S. S. Purple,
Dr. William McCollom.

The Secretary announced the appointment of the following Nominating Committee:

First District, Dr. Douglas Ayres, Dr. J. P. Sharer.
Second District, Dr. T. Wilson, Dr. C. Hammer.
Third District, Dr. H. D. Didama, Dr. C. W. Brown.
Fourth District, Dr. S. T. Clark, Dr. G. E. Fell.
Fifth District, Dr. N. W. Leighton, Dr. J. W. S. Gouley.
At large, Dr. T. D. Strong.

Second Day, Thursday, October 29.
Morning Session.

The meeting was called to order by the President.

The committee appointed to draft resolutions on the death of Dr. Abram Du Bois presented their report, which, upon motion, was received and adopted.

Report of Committee on Resolutions.

The committee appointed to prepare resolutions on the death of Dr. Abram Du Bois, beg leave to present the following:

Dr. Abram Du Bois died in the city of New York on the 29th day of August, 1891, aged 81 years. He was an earnest and active member of the preliminary Council which formulated and led to the organisation of the New York State Medical Association, and a distinguished and honoured member of the medical profession. Your committee offer the following resolutions:

Resolved, That the New York State Medical Association, with deep and sincere regret, have learned of the death of Abram Du Bois, M. D., one of the Founders of this Association.

Resolved, That this Association duly appreciates and bears witness to his many virtues and great professional probity, and will ever cherish his memory for his generous charity both to the public and the profession of medicine.

Resolved, That we tender to the widow and family of the deceased our sincere sympathy in this their great bereavement.

Resolved, That a copy of the foregoing report and resolutions be sent to the relatives of the deceased; and that said report and resolutions be

entered upon the minutes of this Association, and published in the forthcoming volume of Transactions.

SAMUEL T. HUBBARD, M. D., *Chairman.*
SAMUEL S. PURPLE, M. D.
WILLIAM McCOLLOM, M. D.

The following Committee on TREASURER'S Account was appointed:

Dr. D. COLVIN,
Dr. E. M. LYON,
Dr. E. T. RULISON.

The committee reported later in the session as follows:

The committee to whom was assigned the duty of examining the TREASURER'S account and the report thereof, beg leave to report that we have carefully investigated the same, and find them in every particular correct. Respectfully submitted,

D. COLVIN.
E. M. LYON.
E. T. RULISON.

The SECRETARY presented resolutions concerning official appointments in the American Medical Association.

These resolutions were unanimously adopted.

WHEREAS, The constitution of the American Medical Association is such that no medical organisation in the state of New York is entitled to representation therein except the New York State Medical Association,—

Resolved, That our Delegates to the meeting to be held at Detroit in 1892 be instructed to call the attention of the American Medical Association to this fact, and to urge that the Committee on Registration be directed not to register delegates from the state of New York except on credentials from the New York State Medical Association.

Resolved, That the Association approves the protest already entered before the Judicial Council of the American Medical Association against the appointment of an officer of the said Association from the state of New York, when such appointment is of a person not a member of the New York State Medical Association.

Dr. H. O. JEWETT exhibited a double-headed monstrosity, which he presented to the museum of the Association. The brief history obtainable was as follows:

A lady, thirty years of age, rather below medium size but well developed, had had five children before giving birth to this monstrosity. Three of these children were still living. Four or five years previous to this last birth, it was stated by some of those who had been present that she had been delivered of a premature still-born monstrosity. No physician saw this, but the family described the children as being even more closely connected than in the specimen at present under consideration.

In this last case, too, the children were born before the arrival of the accoucheur. They gasped only a few times, and no effort was made to save them. Within an hour after the birth of these, the mother gave birth to a well formed male child.

On motion, the thanks of the Association were given to Dr. JEWETT for this valuable acquisition to the museum.

AFTERNOON SESSION.

The meeting was called to order at 2 p. m. by the VICE-PRESIDENT, Dr. DOUGLAS AYRES.

The session was devoted to the reading and discussion of scientific papers.

NIGHT SESSION.

The meeting was called to order by the PRESIDENT at 8 p. m.

The PRESIDENT stated that on behalf of Mr. and Mrs. Daniel S. Davis, of New York city, he desired to present to the Association the portrait of the late Dr. FRANK H. HAMILTON. Mrs. Davis was the daughter of Professor HAMILTON.

The PRESIDENT said,—"This is a very pleasant duty I have to perform, as I had known Dr. HAMILTON very intimately—first, when I became one of his students, and afterwards when we were associated in school and hospital work. I have never met a man who possessed such a fine sense of the honour of the profession as a body, and of the professional conduct on the part of individuals. Oftentimes, in his criticisms, he carried this to extremes. Perhaps at the very outset of our acquaintance he gave me the key to the ruling motive of his life. When entering his office as a student, he told me that he had some very stringent rules governing the conduct of his students, and then added, 'I wish you always to be a gentleman.' I think this was the governing feature of his conduct, both in his hospital and school relations. I know of no more fitting place for his portrait than the Mott Memorial building, for, long before I ever saw MOTT, I learned about him from HAMILTON. It is eminently proper that this portrait should be hung in this hall. It is an exceedingly accurate portrait, representing him in his later life, probably at his very best. He never laughed loudly, although often he had a smile on his face and a twinkle in his eye, and this expression has been happily portrayed by the artist."

Dr. E. M. MOORE, of Monroe county, moved that the thanks of the Association be given to the donors for this very beautiful and appropriate present. Like the PRESIDENT, he, too, had been early acquainted with Dr. HAMILTON. During his whole lifetime Dr. HAMILTON was engaged in teaching, and we all knew that his position in the fraternity of teach-

ers was in the foremost rank. We should feel deeply indebted to those who had sent us this beautiful gift.

Dr. E. D. FERGUSON, of Rensselaer county, said,—"I rise to second the motion of Dr. MOORE. I, like the PRESIDENT, was for a while a pupil of Dr. HAMILTON, and while I remember him as almost stern at times in his adherence to what he deemed to be right, I also remember him as the kindly man, and as having that pleasant expression so well depicted in the portrait before us. He was one of the Founders of this Association, and, although in feeble health at that time, he took a deep interest in its success. A little volume, which was among the last of his literary labours, was on medical ethics. It is a book which is not as widely known by the profession as it should be. It treats of the logic of ethics, and is, in my judgment, the best and clearest and most useful exposition of those questions which has ever been written."

The motion was carried unanimously.

THIRD DAY, FRIDAY, OCTOBER 30.

MORNING SESSION.

The meeting was called to order by the PRESIDENT.

The SECRETARY presented the report of the Nominating Committee.

Report of the Nominating Committee.

At the meeting of the Nominating Committee there were nine members in attendance. Dr. THOMAS D. STRONG was elected chairman, and Dr. GEORGE E. FELL, secretary.

On nomination of Dr. SIMEON T. CLARK, Dr. JUDSON B. ANDREWS, of the Fourth District, was unanimously nominated for President.

For Vice-Presidents:

First District, Dr. WILLIAM D. GARLOCK.
Second District, Dr. GEORGE E. MCDONALD.
Third District, Dr. LEROY J. BROOKS.
Fifth District, Dr. HENRY VAN HOEVENBERG.

Members of the Council:

First District, Dr. ELBERT T. RULISON, for two years.
First District, Dr. JOHN P. SHARER, nominated for one year in place of Dr. WILLIAM D. GARLOCK.
Second District, Dr. THOMAS WILSON.
Third District, Dr. HOMER O. JEWETT.
Fourth District, Dr. SIMEON T. CLARK.
Fifth District, Dr. JNO. G. TRUAX.

GEORGE E. FELL,
Secretary.

Upon motion, this report was accepted.

It was moved and seconded that the SECRETARY be instructed to cast an affirmative ballot for the list of officers as read. Carried.

The ballot was so cast, and the officers declared duly elected.

The committee appointed to receive and examine the essays presented in competition for the Orton Prize, presented their report, which was read by the SECRETARY as follows:

Report of the Committee on Award of the Orton Prize.

The Committee on Award of the Orton Prize report that they have received and carefully examined ten competing essays.

Bearing in mind the provisions of Dr. ORTON's offer,—that the paper to be preferred should be short and popular in style,—the committee find that the essay entitled "Impure Air and Ventilation of Private Dwellings," bearing the motto "*Omnibus Effulgeo*" [see page 391], best fulfils the purpose of the Orton Prize, in giving an accurate description of the subject in popular phrase. They would, however, advise the omission of "Wolpert's Air Tester," which is unreliable and useless to the popular reader; also of the descriptions of the lowered window pane, Cooper's ventilator, double or hinged panes, the Sheringham valve, Tobin's tubes, Ellison's bricks, hollow ventilating beams, and Mackinnel's method [pages 409–412], for the reasons that most of them are unsuitable to a cold climate, some are inadequate and generally abandoned, and some require changes of house construction, the cost of which would supply better plans under the advice of a competent sanitary engineer.

The committee are compelled to exclude from consideration two studiously elaborate essays, entitled, respectively, "Water as an Agent of Health and Disease," and "Air, Our Atmosphere, as an Agent of Health and Disease," because their great length and very technical character render them virtually unintelligible to the popular reader, and impracticable for secular publication, and therefore not within the conditions of the competition.

ALFRED L. CARROLL.
E. M. MOORE.
J. G. TRUAX.

On motion, the report was ordered placed on file.

It was moved and seconded that the Orton Prize Essay be read by title. Carried.

Dr. J. G. ORTON said that he had been very much gratified at the number of essays which had been offered, and that his object in offering the prize had been accomplished by securing essays of such a nature that they could be published in the secular journals.

Afternoon Session.

The meeting was called to order by the President.

After the reading and discussion of the papers, the newly elected President, Dr. Judson B. Andrews, of Erie county, was escorted to the chair.

Dr. Andrews, in thanking the Association for this honour, said that this was entirely undreamed of, when, along with the others, he went out from the old State Society eight years ago. He would endeavour to follow in the footsteps of Dr. Stephen Smith, who, from his position as commissioner in lunacy, had been his superior officer. The fact that he was allowed to follow in Dr. Smith's footsteps was encouraging to him, as showing that his work during this period had received Dr. Smith's entire approval.

The minutes were then approved.

On motion of the Secretary, the Eighth Annual Meeting of the Association was declared adjourned.

E. D. FERGUSON,
Secretary.

ANNUAL REPORT OF THE COUNCIL

AND

MINUTES OF THE SESSIONS OF THE COUNCIL,

FOR THE YEAR 1891.

The eighth annual session of the Council was held at its room in the Mott Memorial Library building, New York city, on Tuesday evening, October 28, 1891.

The meeting was called to order by the President at 9 p. m.

Present: The Chairman, Dr. Smith, and Drs. Ayres, Carroll, Douglas, Ferguson, Garlock, Gouley, Harvie, Jewett, Strong, Truax, Wilson.

The Secretary reported the following list of applicants, all of whom had been appointed Fellows of the Association since the last meeting of the Council, by circular vote, viz.,—

Merlin J. Zeh, William H. Hull, R. L. Pritchard, Edgar Zeh, H. F. Boursteel, Charles E. Witbeck, Paul E. Tiemann, H. A. Hanbold, Meredith Clymer, Elias B. Boyce, Thomas G. Dickson, L. B. Rulison, F. L. Cooley, James B. Drake, Charles W. Ingraham, Frederick L. Forker, John F. Place, Jr., George O. Williams, D. F. Curtis, Thomas J. Hillis, James Moran.

The following applicants were appointed Fellows, viz.,—

Johnston McLeod, Charles B. White, H. S. Oppenheimer, Albert Shunk, James H. Bissell, William A. Macfarlane, O. Howard Bradley, John M. Haynes, J. Blake White, Frederic M. Warner, Josephine E. Davis.

The Treasurer then made the following report:

The Treasurer, in making his report, wishes to call attention to the fact that though the expenditures for postage and expressage were much increased over the same items for the preceding year, and the larger size of the volume of Transactions required a proportionately increased expenditure in that direction, still the net balance to the credit of the Association is notably increased, and justifies the hope expressed by him last year that a respectable fund may be secured in a short time whereby the Secretary and the Treasurer may receive some compensation.

He would also state that $2,000 of the Library and Building Fund has been invested at an annual interest of five per cent., and within the year he hopes to make another investment from the surplus funds.

Along with this favourable financial showing is the fact that he found a number of Fellows to whom financial misfortune had come, and a remission of their dues was only an act of justice which the Association can well afford.

ANNUAL REPORT OF THE TREASURER FROM OCTOBER 16, 1890, TO OCTOBER 15, 1891.

RECEIPTS—GENERAL FUND.

Balance from last year,	$364.85	
Dues,	2,635.00	
Initiation fees,	195.00	
Sale of Transactions,	139.00	
		$3,333.85

DISBURSEMENTS.

Sundries, including the printing and partial distribution of the Transactions,	$2,102.99	
Postage stamps,	108.63	
Expressage and freight,	37.22	
		$2,248.84
Balance in General Fund, October 15, 1891,		$1,085.01

LIBRARY AND BUILDING FUND.

As reported at last meeting,	$2,550.32	
Interest,	115.61	
	$2,665.93	
Disbursements,	183.52	
Balance Library and Building fund October 15, 1891,		$2,482.41
Total funds in treasury October 15, 1891,		$3,567.42

Outside of the above-named funds the Treasurer holds $100, being the Orton prize, and to be paid out under the direction of the Committee of Award.

[Signed] E. D. FERGUSON,
Acting Treasurer.

The report of the Treasurer was accepted and adopted.

On motion, Drs. A. L. Carroll, E. M. Moore, and J. G. Truax were appointed the Committee of Award on the Orton Prize Essay, and the Secretary was authorised to receive their report.

On motion, the following names were directed to be removed from the list of Fellows under Article VI, Section 4, of the By-Laws: E. E. Barnum, George W. Cook, C. E. Creal, C. A. Gillette, William A. Hall,

S. Augden Hills, E. S. Howes, C. M. Johnson, Samuel Lewengood, J. H. Miller, G. W. Nelson, J. L. D. Roberts, A. Sayres, M. A. Tully.

Dr. Gouley, in behalf of Mr. and Mrs. Daniel A. Davis, then presented a portrait painting of Dr. Frank H. Hamilton, a Founder of the Association. The gift was accepted, and was referred to the President for presentation to the Association.

Bills for the printing and distribution of the programme, and other items of expenditure, amounting to $75.62, were then audited, and the Treasurer authorised to pay the same.

On motion, it was voted that $5 be paid as the subscription of the Association to the Home Library Association.

By resolution, the Treasurer was directed to pay $100 additional to the trustees of the Mott Memorial Library, for use in the building.

The Committees on Medical Legislation, on Public Hygiene, and on the Progress of Medicine, then reported progress.

The Secretary then presented the following documents relative to the Taylor Library:

NEW YORK, December 20, 1890.

To the Council of the New York State Medical Association, through E. D. Ferguson, M. D., Secretary.

In accordance with the accompanying document, which is a copy of the original deed of gift, we have the honour to inform you, that, the first special provision in the second section of the deed having been complied with, the library of the late Dr. Isaac E. Taylor has, this 20th day of December, 1890, been officially conveyed to the Association, and that the trust is thereby ended.

Witness our hands and seals: J. W. S. GOULEY, M. D.
EDMUND S. F. ARNOLD, M. D.
AUSTIN FLINT, M. D.

This is accompanied, also, with an acknowledgment of receipt of the Taylor Library, which we have formally turned over to the Library Committee of the New York State Medical Association.

J. W. S. GOULEY, M. D.
EDMUND S. F. ARNOLD, M. D.
AUSTIN FLINT, M. D.

KNOW ALL MEN BY THESE PRESENTS, that I, Isaac E. Taylor, of the city of New York, party of the first part, for and in consideration of the sum of one dollar, lawful money of the United States, to me in hand paid at or before the ensealing and delivery of these presents by Dr. J. W. S. Gouley, Dr. E. S. F. Arnold, and Dr. Austin Flint, of the same place, Fellows of the New York State Medical Association, parties of the second part, the receipt whereof is hereby acknowledged, have bargained and

sold, and by these presents do grant and convey unto the said parties of the second part and their assigns, all those certain 1676 [sixteen hundred and seventy-six] volumes and journals, composing my medical library, a catalogue of which is attached to this agreement and made a part thereof, together with the book-cases which contain the same, upon the following trust, viz.:

To receive the same, and deposit them in the library of the New York State Medical Association, provided that if the said New York State Medical Association shall, within five years from the date hereof, secure a suitable building for the keeping and maintenance of its own and the library hereby conveyed, then the parties of the second part are hereby directed to grant and convey the said library and every part and parcel thereof to the said New York State Medical Association, without consideration, as a free gift of the said party of the first part, and then this trust shall determine and come to an end: *Provided*, however, that if the said New York State Medical Association shall not within the time limited secure some suitable building as herein provided, then, in the event of my decease, I direct the said trustees to sell and dispose of said library and every part thereof at public auction, and, after deduction from the proceeds of such sale all expenses connected therewith, to pay over the balance thereof to my legal representatives:

Provided, however, that if I be living at the expiration of this trust, then this instrument shall be in all things void.

In the event of the death of any one of the aforesaid trustees, or their successors, during the continuance of this trust, the survivor or survivors of them shall have power to appoint any Fellow of the New York State Medical Association as trustee to fill any such vacancy.

In witness whereof, I have hereunto set my hand and seal the twelfth day of June, in the year one thousand eight hundred and eighty-eight.

[Signed] ISAAC E. TAYLOR. [L. S.]

Signed, sealed, and delivered in the presence of

J. W. S. GOULEY,
EDMUND S. F. ARNOLD.

By order of the Council of the New York State Medical Association, the library of the said Association and the Taylor Library have been duly transported from the Carnegie Laboratory, where they were stored, to the Mott Memorial Library building, the latter place having been determined by the Council of the Association to be a suitable building for the keeping and maintenance of its own and the library given by the late Dr. Taylor in 1888. The first special provision in the second section of the deed of gift, executed by Dr. Taylor on June 12th, 1888, has therefore been complied with, and the trust is consequently ended.

On this 20th day of December, 1890, we acknowledge receipt of the

sixteen hundred and seventy-six (1676) volumes and the four book-cases constituting the Taylor Library, officially turned over to us by the trustees of the aforenamed Library.

STEPHEN SMITH, President of the N. Y. S. M. A.
E. D. FERGUSON, Secretary of the N. Y. S. M. A.
GLOVER C. ARNOLD,
JOHN SHRADY,
JOHN G. TRUAX,
J. W. S. GOULEY,
Library Committee N. Y. S. M. A.

The Secretary then read the

Seventh Annual Report of the Library Committee of the New York State Medical Association.

October 27, 1891.

This seventh annual report of the Library Committee shows but a slight increase in the number of volumes, only one hundred and thirty-three (133) volumes having been received since the last report, which gave a total of eight thousand seven hundred and eighty-eight (8,788) bound and unbound volumes in the library. This year's increase of one hundred and thirty-three (133) makes the total number of volumes eight thousand nine hundred and twenty-one (8,921) at this date.

The Index Catalogue of the Surgeon-General's library is regularly received, as are also exchanges from a number of state medical societies.

The removal of the library from the Carnegie Laboratory to the Mott Memorial building was completed on the 5th day of May, 1890, from which time, to October 26th, 1891, there have been one thousand four hundred and ninety-four (1,494) visits (730 in 1890, and 764 in 1891) to the library by Fellows of the Association, by members of the profession residing in the city, and by others from different states and countries, by medical students, and, from time to time, by non-medical persons.

The thanks of the Committee are due Dr. E. S. F. Arnold for a catalogue of the greater part of the pamphlets which have been placed in pamphlet-cases and arranged by subject, while other cases contain the pamphlets issued by Fellows of the Association.

J. W. S. GOULEY, M. D.,
Director of the Library and Chairman of the Library Committee.

The report was accepted and adopted.

The Secretary presented the

Report of the Committee on Publications.

The seventh volume of our series of Transactions, containing 642 pages, has been distributed to those entitled to receive it. An edition of 1,200 copies was printed and bound for $1,535, though freight, expressage, postage, etc., brought the entire expenditure connected with the printing and distribution of the volumes to nearly $1,800.

Since the adoption, at the last annual session of the Council, of the resolution to furnish back volumes of Transactions to Fellows of the Association at $1 per volume, there has been a notable increase in the sale of Transactions, the receipts from that source amounting to $139 up to October 16, and there will probably be an annual sale equal to that for several years to come.

Concerning our stock of Transactions, we find that D. Appleton & Co. have 105 copies of Vol. 1, and 208 copies of Vol. 2, and the Secretary has about twenty-five copies of each of those volumes. This will probably serve for a year or two, when it will be necessary to print a small edition from the plates that we have for those volumes, in order to correspond with the number on hand of the later volumes.

It seems very desirable to have our back volumes all in one place for storage, and it is suggested that some action be taken with that object in view.

E. D. FERGUSON, *Chairman.*

On motion, the report was accepted, and the Secretary, and Drs. Carroll and Gouley, were appointed a committee to ascertain the number of back volumes of Transactions belonging to the Association, and to arrange for their storage and care.

It was then voted that the Treasurer be the treasurer of the Library Committee.

Dr. Carroll, as Chairman of the Committee on the Revision of the Constitution and By-Laws, made the following report:

Report of Committee on Amendments to the Constitution and By-Laws.

BY-LAWS.

Art. II, Sec. 4. In the 3d line, erase the words "to the Council" after the words "he shall make a report." In the 6th line, substitute *Council* for "Association;" substitute *annual* for "regular," and add *thereof* after "meeting," so that the sentence shall read, *He shall make a report of the condition of the finances of the Association whenever directed so to do by the Council, and shall make a full and complete report of the finances to the Council at each annual meeting thereof.*

Sec. 5. In the 1st line substitute *Chairman of the Library Committee* for

"Director of the Library;" in the 2d and 3d lines, substitute *Director of the Library* for "Chairman of the Library Committee;" and add the words, *and shall be, ex-officio, a member of the Council.*

Sec. 6. In the 1st line, substitute *Chairman of the Committee of Arrangements* for "Director of the Library." In the 3d line, insert *proper means* between the words "to provide" and "for the registration of Fellows," and after the latter word erase all that follows, down to "during the days of the said meeting." In line 12, after the words "paid in full," insert *except as hereinafter provided;* and after the words "No Fellow" omit "whose" and substitute *in arrears for.* In line 13, erase the words "have not been paid in full."

Art. III, Sec. 1. In line 2, substitute *Secretary* for "Secretaries."

Sec. 4. In line 4, omit the word "five" before "Fellows."

Sec. 9. In line 2, insert *or by-laws* after "the code of ethics."

Art. IV, Sec. 2. In line 1, erase the words "removing from the state or."

Sec. 3. In line 1, substitute *owing* for "his," and *or* for "and," and in line 2, omit the words "or any part thereof, remain unpaid," so as to read *No Fellow shall be permitted to resign while owing dues or assessments, or while he is under charges,* &c.

Sec. 4 to be erased; and Secs. 5 and 6 to be numbered 4 and 5 respectively.

Art. V, Sec. 2. In line 1, erase the word "only;" substitute *kinds and degrees* for "kind and degree," and *beyond* for "except;" and in line 3, insert *censure, suspension, or* before the word "expulsion," so that the section shall read *The kinds and degrees of discipline of Fellows, beyond the dropping of names from the list of Fellows for non-payment of dues and assessments, shall be censure, suspension, or expulsion from the Association.*

Art. V, Sec. 3. Erase the first sentence, down to the words "In case the Council."

Sec. 4. In line 2, substitute *By-Laws* for "Code of Ethics," and add *or conduct prejudicial to the interests of the Association;* omit all that follows in the 2d, 3d, 4th, and 5th lines, down to the words "In such cases." In line 6, after the words "to appear before," erase "them," and substitute *a committee of not less than three of its own members, to be known as the Judicial Committee.* In line 8, erase "them" and substitute *the said committee.* At the end of line 12, after the words "the Council," insert *upon the report of the Judicial Committee.* In line 17, substitute *Judicial Committee* for "Council." In line 18, substitute *its* for "their." In line 19, substitute *it* for "they," and *investigate* for "decide upon." In line 21, substitute *its conclusions* for "their decision," and *Council* for "Association." At the end of the last line substitute *Judicial Committee* for "Council."

Sec. 7. In first line, substitute *disciplined* for "expelled."

Art. VI, Sec. 1. In line 3, substitute *five* for "three" before the word "dollars." [The addition beginning *In case of sickness or financial misfortune*, &c., passed in 1890, to be inserted.]

Sec. 3 to be erased.

Sec. 4 to be numbered 3. In first line, substitute *are in arrears for* for "shall have failed to pay their," and in line 2, substitute *may* for "shall." In lines 7 and 8, erase the words "before the adjournment of the next regular meeting of the Association."

Art. X, Sec. 2. In line 2, substitute *in which* for "to be devoted to," and insert *shall be transacted* after "business of the Association."

Sec. 3. In the order of business, in paragraph I, erase "at 10 a. m." Erase II, VI, and XII, and re-number the remaining paragraphs in proper order.

Sec. 4. In paragraph I, erase "at 10 a. m." Erase II and VII, and re-number the remaining paragraphs.

Sec. 5. In paragraph I, erase "at 10 a. m." Erase II and VIII, and re-number the remaining paragraphs.

Omit Section 6.

Sec. 7 to be numbered 6. In lines 1 and 2, erase "shall begin at 2 p. m., and," and at the end of the section add *except on the last day, when business may be transacted and the minutes adopted.*

Art. X. Sections 8, 9, 10, 11, and 12 to be numbered 7, 8, 9, 10, and 11, respectively. In the newly numbered Section 10, after the words "No voluntary communication," insert *not announced in the programme*, and in the second line insert *such* before "voluntary communications."

Art. XII to be omitted.

Art. XIII to be numbered XII.

CONSTITUTION.

Art. II, Sec. 2. In the 2d line, between the words "graduates in medicine" and "residing" insert *appointed while*, so as to read *appointed while residing in the state of New York.*

Sec. 3. In the 3d line, omit the word "signing" and substitute *declaring their adherence to.* In the 8th line, erase the word "Corresponding" before "Secretary."

Sec. 5. In the 1st and 2d lines, omit the word "have" and the words "or shall have qualified," so that the section shall read, *Fellows of the Association who qualified as such at or previous to the first regular meeting*, &c.

Omit sections 6 and 7.

Section 8 to be numbered 6, and in the 5th line, after the words "regular physicians," insert *or surgeons.* In the 6th line, erase the words "State of New York," and substitute *United States*, so as to read, *Such*

Honorary Fellows must be regular physicians or surgeons, not residents of the United States, &c.

Sections 9 and 10 to be numbered 7 and 8 respectively.

Section 11, passed at the meeting in 1890, to be numbered Section 9.

Sections 12 and 13, proposed at the meeting in 1890, to be numbered 10 and 11.

Art. III, Sec. 1. In the 3d line, between the words "a Secretary" and "a Treasurer" insert *and*, and erase the words, "and a Director of the Library."

Sec. 2. In the 3d and 4th lines, insert *and* between the words "Secretary" and "Treasurer," and erase the words "and Director of the Library."

Omit Art. IV.

Art. V to be numbered IV.

The report of the committee was accepted and adopted.

The Council then adjourned.

E. D. FERGUSON, *Secretary.*

The new Council met in its room at 4 p. m., October 30, 1891, with the President in the chair.

Present: The Chairman, Dr. J. B. Andrews, and Drs. Ayers, Carroll, Douglas, Ferguson, Garlock, Gouley, Strong, Truax, and Van Hoevenberg.

It was decided to open the next annual meeting on Tuesday, November 15, 1892.

Dr. Nicholas Senn, of Chicago, Ill., was then nominated as one of the Corresponding Fellows by Drs. Gouley and Ferguson.

The following applicants for Fellowship were appointed: Dwight Dudley, Peter Hughes, Morris N. Bemus, Frank Ellsworth Slater, John S. Fogg.

The President appointed Drs. Stephen Smith, A. L. Carroll, and J. G. Truax as the Committee on Medical Legislation, with authority to add to their number.

The members of the Council for the Fifth District were appointed the Committee of Arrangements, with Dr. Truax as Chairman.

The members of the Council for the Second District were appointed the Committee on Publications, with the Secretary as Chairman and Editor.

The minutes were then approved, and the Council adjourned.

E. D. FERGUSON, *Secretary.*

CONSTITUTION AND BY-LAWS.

CONSTITUTION.

ARTICLE I.

SECTION 1. This Association shall be called THE NEW YORK STATE MEDICAL ASSOCIATION.

SEC. 2. The objects of the Association shall be,—

First. The cultivation and advancement of the Science of Medicine.

Second. The promotion of public health.

Third. The maintenance of the honour and character of the Medical Profession.

Fourth. The establishment and furtherance of cordial professional relations and fellowship between the Medical Profession of the State of New York and the Profession of other States of the United States and of Foreign Countries, through the Medical Associations and Societies of such States and Countries.

ARTICLE II.

SECTION 1. For the purposes of this Association, the State shall be divided into five geographical districts, to be called, respectively, the 1st, or Northern District; the 2d, or Eastern District; the 3d, or Central District; the 4th, or Western District; and the 5th, or Southern District.

These districts shall comprise the sixty counties of the State, arranged as follows:

First, or Northern District.

Franklin, Fulton, Hamilton, Herkimer, Jefferson, Lewis, Montgomery, Oneida, Oswego, St. Lawrence.

Second, or Eastern District.

Albany, Clinton, Columbia, Essex, Greene, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington.

Third, or Central District.

Broome, Cayuga, Chemung, Chenango, Cortland, Delaware, Madison, Onondaga, Otsego, Schuyler, Seneca, Tioga, Tompkins.

Fourth, or Western District.

Allegany, Cattaraugus, Chautauqua, Erie, Genesee, Livingston, Monroe, Niagara, Ontario, Orleans, Steuben, Wayne, Wyoming, Yates.

Fifth, or Southern District.

Dutchess, Kings, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester.

SEC. 2. This Association shall be composed of Fellows, who are regular practitioners of medicine or regular graduates in medicine, appointed while residing in the State of New York.

SEC. 3. All physicians in the State of New York, who are in good standing, and who subscribe to the code of ethics of this Association, may become Fellows upon paying the initiation fee and declaring their adherence to the Constitution and By-Laws; provided that each candidate for fellowship shall make a formal application therefor, and that this application shall have been approved in writing by one or more members of the Council from the district in which such candidate resides. The candidate's application shall then be transmitted, through the Secretary, to the Council for final action.

SEC. 4. Fellows of the Association who participated in the foundation of the same, at the Convention held in the city of Albany on February 4th and 6th, 1884, shall be classified as Founders, and shall be so indicated in all lists of Fellows.

SEC. 5. Fellows of the Association, who qualified as such at or previous to the first regular meeting of the Association in November, 1884, shall be classified as Original Fellows, and shall be so indicated in all lists of Fellows.

SEC. 6. In addition to the ordinary Fellows of the Association, the Council, with the consent of the Association, may appoint, at any annual meeting, Honorary Fellows; provided that such Honorary Fellows shall have been nominated at the annual meeting immediately preceding, by three Fellows. Such Honorary Fellows must be regular physicians or surgeons, not residents of the United States, who have been long eminent in the profession; and not more than five Honorary Fellows shall be appointed at any annual meeting. The total number of Honorary Fellows shall be limited to fifty.

SEC. 7. The Council, with the consent of the Association, may appoint, at any annual meeting, Corresponding Fellows; provided that such Corresponding Fellows shall have been nominated at the annual meeting immediately preceding, by three Fellows. Such Corresponding Fellows must be regular physicians of distinction, not residents of the State of New York, who are actively engaged in the cultivation of medical

science; and not more than five Corresponding Fellows shall be appointed at any annual meeting. The total number of Corresponding Fellows shall be limited to fifty.

Sec. 8. Honorary Fellows and Corresponding Fellows shall have all the privileges of ordinary Fellows, except that they shall not be eligible to any office in the Association, and shall not have the right to vote in the meetings of the Association. They shall not be required to pay any initiation fees, dues, or assessments.

Sec. 9. The Council may create a retired list of Fellows, who shall be exempt from the payment of dues and assessments, but shall pay for the volumes of Transactions when they shall wish to receive them. This list shall include those Fellows in regular standing, who, by reason of age or infirmity, have ceased to practise medicine or surgery, and who may wish to be entered thereon.

Sec. 10. The Council may at any time appoint, as Fellows of the Association, physicians in good standing residing in other States, in the British Provinces, or in other neighbouring countries; provided that these physicians subscribe to the Code of Ethics of this Association; and provided that each candidate be endorsed by two members of the Council. Fellows so appointed shall be styled non-resident Fellows.

Sec. 11. Non-resident Fellows shall have all the privileges of resident Fellows, except that they shall not be eligible to any office in the Association, and they shall not have the right to vote in the meetings of the Association. Non-resident Fellows shall not be required to pay any initiation fees; they shall not be subject to assessments; but they shall pay annual dues of five dollars, and shall receive gratis a copy of each year's Transactions of the Association.

ARTICLE III.

Section 1. The titular officers of the Association shall be a President and four Vice-Presidents (one of these five officers to come from each of the five districts), a Secretary, and a Treasurer. In addition, there shall be elected two Fellows from each district, and one Fellow shall be appointed at large by the President-elect, who, with the titular officers, shall together constitute the Council of the Association.

Sec. 2. The President and the Vice-Presidents shall be elected for the term of one year. The elected members of the Council shall serve each for the term of two years. The Secretary and Treasurer shall each be elected for the term of three years. The member of the Council appointed at large by the President-elect shall serve for the term of one year.

Sec. 3. The President-elect shall, with the consent of the Association, appoint each year, to serve during his term of office, such standing committees as may, in his judgment, be necessary properly to carry out the objects of the Association.

ARTICLE IV.

SECTION 1. No part of this Constitution shall be abolished, altered, or amended, and no addition shall be made thereto, except at a regular meeting of the Association, after due notice of such alterations or additions shall have been given in writing by a Fellow at the regular meeting immediately preceding, and then only by a vote of three fourths of the Fellows present and voting.

BY-LAWS.

ARTICLE I.

MEETINGS AND NOMINATIONS.

SECTION 1. The Association shall hold regular meetings, one in each year, at such time and place as shall be designated by the Council, each meeting to continue for at least three days.

SEC. 2. During the morning session of the first day of each regular meeting, a Nominating Committee shall be constituted, composed of two representatives from each district, to be appointed by the Fellows from the respective districts present at the meeting, and one member appointed at large by the President, who shall present, for approval and adoption by the Association, a full list of officers and members of the Council to be elected.

SEC. 3. In case the list, or any part of the list, of nominees presented by the Nominating Committee be not approved and adopted by the Association, the Nominating Committee shall present new nominees for such offices as may remain unfilled, and shall continue so to do until all the officers of the Association and members of the Council shall be chosen.

SEC. 4. The officers of the Association and members of the Council, at the expiration of their respective terms of office, shall, without delay, deliver up and transfer to their successors all moneys, books, manuscripts, vouchers, and other property of the Association, which may be in their possession, and shall take receipts therefor.

SEC. 5. The Nominating Committee shall be discharged when all the officers of the Association and members of the Council to be elected have been chosen by the Association.

ARTICLE II.

DUTIES OF OFFICERS.

SECTION 1. The President shall preside at all meetings of the Association and of the Council, shall preserve order at such meetings, shall

have the power to adjourn the meetings should they become disorderly, and shall appoint all special committees not otherwise ordered by resolution.

SEC. 2. One of the Vice-Presidents, at the request of the President, or, in the President's absence, the Vice-President selected by the Vice-Presidents present at the meeting, shall temporarily perform the duties of the President. In case of the death, disability, or resignation of the President, one of the Vice-Presidents shall be elected as acting President by the Council, and shall perform the duties of the President until the next annual election of officers.

SEC. 3. The Secretary shall make and preserve accurate minutes of the meetings of the Association, and shall perform the usual duties pertaining to the office of Secretary. He shall conduct the official correspondence of the Association, shall preserve all such correspondence, including copies of official letters written by him, and shall act as Secretary of the Council. He shall also notify each Fellow of his appointment to Fellowship, and shall furnish him with an official certificate of such appointment in the following form:

CERTIFICATE OF FELLOWSHIP OF THE NEW YORK STATE MEDICAL ASSOCIATION.

This is to certify that . . . . . is a Fellow, in good standing, of THE NEW YORK STATE MEDICAL ASSOCIATION, having been duly appointed on the . . . . . day of . . . . . , 18 . .

. . . . . .
President.

. . . . . .
Secretary.

[L. S.]

ENDORSEMENTS.

The person mentioned in this certificate has this day resigned his Fellowship, and has thereby relinquished all right and title to any share in the property of the Association.

. . . . . .
Secretary.

Dated on the . . . . . day of . . . . . , 18 . .

The person mentioned in this certificate has this day been received again into full Fellowship in the Association.

. . . . . .
Secretary.

Dated on the . . . . . day of . . . . . , 18 . .

Sec. 4. The Treasurer shall receive all moneys paid to the Association, in any way and from any source, and shall dispose of the same as directed by the Council. He shall make a report of the condition of the finances of the Association, whenever directed so to do by the Council, and shall make a full and complete report of the finances to the Council at each annual meeting thereof.

Sec. 5. The Chairman of the Library Committee shall have charge of the Library, under the direction of the Council, and he shall be Director of the Library, and shall be, ex officio, a member of the Council.

The Council may appoint a Librarian, with such duties as may be found expedient, said Librarian to be under the direction of the Director of the Library.

Sec. 6. The Secretary, Treasurer, and Chairman of the Committee of Arrangements shall together constitute a Committee of Registration for the regular meetings of the Association, whose duty it shall be to provide proper means for the registration of Fellows during the days of the said meeting. Any one or two members of this Committee shall be competent to act in the absence of the other members or member. Any Fellow may register for a meeting on payment of his dues and assessments for said meeting, or on presentation of the Treasurer's receipt therefor, or if it shall appear from the books of the Treasurer that his dues and assessments have been paid; provided always that all back dues and assessments have been paid in full, except as hereinafter provided. No Fellow in arrears for dues and assessments shall be entitled to participate in any way in the proceedings of the Association, nor shall he be a candidate for any office in the Association or for membership in the Council. The ayes and nays, when demanded on any question, shall always be called from the official register of the meeting. Each Fellow registering shall do so personally and with his own hand; and in so doing he pledges himself in honour to adhere to and support the Constitution and By-Laws of the Association, including its Code of Ethics.

Sec. 7. For all legal purposes, the President and the four Vice-Presidents shall constitute and shall be regarded as the Board of Trustees of the Association.

ARTICLE III.

DUTIES OF THE COUNCIL.

Section 1. The Council shall hold an annual meeting at some convenient time and place, to be determined by the President and Secretary, not more than thirty days before each regular meeting of the Association, and shall also hold such meetings during the regular meetings of the Association as may be necessary for the transaction of its business. The Council shall also hold, during the year, such other meetings as may be necessary. The President shall call a special meeting of the Council

when requested in writing so to do by five members thereof, the request specifying the object of such meeting.

SEC. 2. Seven members of the Council shall constitute a quorum.

SEC. 3. In case at any time, except during the meetings of the Association, it shall be impracticable to hold a meeting of the Council, questions may be determined by written votes of the members of the Council; provided always that the question or questions to be determined shall have been presented in writing or printing, and in identical language, to each and every member of the Council.

SEC. 4. Before the adjournment of each regular meeting of the Association, the Council-elect shall fix the time and place of the next meeting of the Association, and shall appoint, subject to the approval of the Association, a committee of Fellows, to be known as the Committee of Arrangements, whose duty it shall be to make suitable arrangements for such meeting.

SEC. 5. The President and Secretary shall be *ex-officio* members of the Committee of Arrangements.

SEC. 6. The President and Secretary, assisted by the Committee of Arrangements, shall provide for papers to be read and discussions to be held at the meetings of the Association.

SEC. 7. The Council shall report to the Association at each regular meeting the names of all Fellows admitted during the year immediately preceding such meeting, and the names of all Fellows who have resigned or have been dropped from the list of Fellows.

SEC. 8. The Council shall authorise and direct all deposits and investments of the funds of the Association, shall order all expenditures to be made by the Treasurer, and shall audit the accounts of the Treasurer, so as to report upon the same at each annual meeting of the Association. The funds of the Association shall not be invested, except in bonds of the United States or of the State of New York, or on first mortgages on improved real estate in the State of New York, such mortgage or mortgages not to exceed one half of the adjudged value of such real estate.

SEC. 9. The Council shall take cognisance of any and all apparently flagrant violations by a Fellow or Fellows of the Code of Ethics or By-Laws of the Association, and shall act upon all charges brought by a Fellow or Fellows against another Fellow or Fellows, as provided for in the section relating to "Ethics and Discipline."

SEC. 10. The Council shall fill all vacancies in the offices of the Association, and the officers so appointed shall serve until the next succeeding annual election; and the Council shall, in the same manner, fill all vacancies that may occur in the number of its members who have been elected by the Association.

SEC. 11. The Council shall embody in their annual report a statement of the investments and of the condition of the funds of the Association.

Sec. 12. The Council shall take charge of all the real and personal property now or at any future time in the possession of the Association.

Sec. 13. At each regular meeting of the Association, the Secretary of the Council shall read, as part of the annual report of the Council, its minutes for the year.

Sec. 14. The Council shall manage the affairs of the Association, except as otherwise provided in the Constitution and By-Laws, and shall appoint from its own number, or from the list of Fellows, such committees as may, in the judgment of the council, be necessary for the transaction of its business.

ARTICLE IV.

APPOINTMENT, RESIGNATION, AND REINSTATEMENT OF FELLOWS.

Section 1. All applications for fellowship shall be made in accordance with Section 3 of Article II of the Constitution.

Sec. 2. A Fellow desiring to resign his fellowship shall send to the Secretary his resignation in writing, by which act he severs his connection with the Association. If the dues and assessments of the Fellow resigning be paid in full to the date of his resignation, the Secretary shall, at the request of such Fellow, endorse upon his certificate of fellowship the fact and date of the resignation, and shall return the certificate so endorsed to the Fellow, who shall then be considered as having formally resigned from the Association, and as having relinquished all right and title to any share in the property of the Association.

Sec. 3. No Fellow shall be permitted to resign while owing dues or assessments, or while he is under charges which may lead to his expulsion, unless he be allowed to resign by special resolution of the Association.

Sec. 4. An application for reinstatment to fellowship in the Association shall be submitted to and considered by the Council in the same manner as an original application for fellowship; except, that on the presentation of a duly authenticated certificate of former fellowship, together with satisfactory evidence of good professional standing during the time following the resignation of former fellowship, payment of the initiation fee shall not be required when the former Fellow is reinstated. In case of the reinstatment of a former Fellow, the Secretary shall endorse upon the certificate of former fellowship the fact and date of such reinstatement.

Sec. 5. No former Fellow, who has been expelled, or who has been dropped from the list of Fellows for non-payment of dues or assessments, can be reinstated according to the provisions of Section 4 of this Article, but such former Fellow may be appointed, according to the provisions of the Constitution, on payment of his initiation fee, if his back dues and

assessments be paid in full up to the date when his previous fellowship had ceased.

ARTICLE V.

ETHICS AND DISCIPLINE.

SECTION 1. The Code of Ethics of the American Medical Association shall be the Code of Ethics of this Association, and shall form an integral part of these By-Laws.

SEC. 2. The kinds and degrees of discipline of Fellows beyond the dropping of names from the list of Fellows for non-payment of dues and assessments, shall be censure, suspension, or expulsion from the Association.

SEC. 3. In case the Council shall be officially notified, by any County or District Association or Society in affiliation with this Association, of the expulsion from such Association or Society of a member or members who are also Fellows of this Association, such member or members shall be expelled from this Association.

SEC. 4. The Council shall hear all complaints against a Fellow or Fellows for violation of its By-Laws, or for conduct prejudicial to the interests of the Association. In such cases, the Council shall notify to appear before a committee of not less than three of its own members, to be known as the Judicial Committee, any and every Fellow against whom a charge or charges have been preferred. With the said notification to appear before the said committee, they shall furnish to the accused Fellow a copy of the charge or charges made against him. They shall also notify the accusing Fellow or Fellows to be present with the Fellow against whom the charge or charges have been made, when the said charge or charges shall be carefully investigated. The Council, upon the report of the Judicial Committee, shall decide upon the said charge or charges at as early a day as is practicable, and shall report their decision to the Association at the regular morning session next succeeding the day on which their decision shall have been made. In case the accused or accusing Fellows, or both, be not present at the time appointed for the investigation, the Judicial Committee may, at its pleasure, either adjourn the investigation once, and once only, for a period not longer than one month, or it may investigate the charge or charges at the time first appointed for the investigation, and report its conclusions to the Council; provided, always, that the accused Fellow shall be entitled to one such adjournment upon his personal or written application for the same to the Judicial Committee.

SEC. 5. The Council shall investigate all apparently flagrant violations of medical ethics by a Fellow, such as improper publications, that come to their knowledge or are brought to their notice in any way. They shall investigate such apparent violations in the same manner as provided

for in Section 4 of this Article, except that it shall not be necessary that any formal charge or charges be made by a Fellow.

SEC. 6. A charge against a Fellow shall be made in writing, signed by the Fellow or Fellows making the charge, enclosed in a sealed envelope, endorsed "Charges against a Fellow," and shall be sent to the Secretary, to be by him presented to the Council at its next meeting.

SEC. 7. A Fellow can be disciplined only at a regular meeting of the Association, upon the recommendation of such action by the Council, and then by an affirmative vote of a majority of the Fellows present and voting.

ARTICLE VI.

INITIATION FEE, DUES, AND ASSESSMENTS.

SECTION 1. The initiation fee shall be five dollars, and the annual dues for each current year, payable at or before each regular meeting, shall be five dollars. In case of sickness or financial misfortune, the Council may remit or otherwise settle arrearages of dues, when it is probable the beneficiary will be able to continue payments in the future.

SEC. 2. The Council may, at its discretion, make an assessment or assessments upon Fellows, such assessment or assessments not to exceed two dollars for each Fellow for any one current year.

SEC. 3. The names of all Fellows who are in arrears for dues and assessments for three consecutive years may be dropped from the list of Fellows; and, within one month of the time when the dues and assessments for the third year shall become payable, the Treasurer shall notify Fellows in arrears for two consecutive years that the provisions of this section will be enforced against them unless payment of such arrears be made.

ARTICLE VII.

PUBLICATIONS.

SECTION 1. Each and every Fellow shall be entitled to receive one printed copy of the Constitution and By-Laws of the Association, and at least one such copy shall be sent to the American Medical Association and to each and every Association or Society in affiliation with this Association.

SEC. 2. The Council, or a sub-committee thereof appointed by the Council, to be known as the Committee on Publications, shall have full charge of all publications by the Association, with power to determine what scientific papers, communications, and discussions shall appear in the printed Transactions of the Association.

SEC. 3. No paper that has appeared in any other publication prior to being read at a meeting of the Association, shall be printed as a part of the Transactions of the Association.

Sec. 4. All papers and communications presented or read at a regular meeting of the Association shall be the property of the Association, and shall not be published except by permission of the Council or of the Committee on Publications.

ARTICLE VIII.

DELEGATES TO OTHER MEDICAL ASSOCIATIONS AND SOCIETIES.

Section 1. All delegates to other Medical Associations or Societies shall be appointed at the proper time and for the proper period by the Council, and the Council shall fill all vacancies in the number of such delegates.

Sec. 2. Delegates to other Medical Associations or Societies shall be required to carry out, in their representative capacity, the views and wishes of this Association; and such delegates shall act in strict accordance with the instructions of the Association. Any action taken by a delegate or delegates, in wilful opposition to the instructions of the Association, shall render such delegate or delegates liable to expulsion from fellowship in the Association, under the provisions of the Article relating to "Ethics and Discipline."

Sec. 3. The Association may or may not, at its pleasure, instruct its delegates; but all instructions to delegates shall be in the form of a resolution or resolutions passed at an annual or special meeting.

ARTICLE IX.

DELEGATES FROM OTHER ASSOCIATIONS AND SOCIETIES AND INVITED GUESTS.

Section 1. At any regular meeting of the Association, duly qualified delegates from other State Associations and Societies and from foreign Societies may be received, subject to the approval of the Council; and such delegates may read papers, and participate in the scientific proceedings of the Association, when invited so to do by the President, with the consent of the Association. The same privileges may be accorded in the same way to members of the medical profession who are not residents of the State of New York.

ARTICLE X.

MEETINGS.

Section 1. A regular meeting of the Association shall take place each year, and shall continue for at least three days.

Sec. 2. On each day of meeting the Association shall hold two sessions,—a morning session in which the business of the Association shall be

transacted, and an afternoon session to be devoted to scientific papers, communications, and discussions.

SEC. 3. The Order of Business for the morning session of the first day of each regular meeting of the Association shall be as follows:

I. Calling the meeting to order by the President, or, in his absence, by one of the Vice-Presidents.
II. Report of the Committee of Arrangements.
III. President's Address.
IV. Annual report of the Council.
V. Reports of Special Committees, to be read in the order of appointment of such Committees.
VI. Unfinished business.
VII. New business.
VIII. Announcement by the presiding officer to the Fellows from the different districts that the Fellows representing such districts shall appoint two members of the Nominating Committee.
IX. Appointment by the President of a member at large of the Nominating Committee.
X. Adjournment of the session.

SEC. 4. The Order of Business for the morning session of the second day and of all subsequent days, except the last day, shall be as follows:

I. Calling the meeting to order.
II. Communications from the Council.
III. Reports of Special Committees, to be read in the order of appointment of such committees.
IV. Unfinished business.
V. New business.
VI. Adjournment of the session.

SEC. 5. The Order of Business for the morning session of the last day of the meeting shall be as follows:

I. Calling the meeting to order.
II. Communications from the Council.
III. Report of the Nominating Committee, and action upon such report by the Association.
IV. Reports by Special Committees, to be read in the order of appointment of such committees.
V. Unfinished Business.
VI. New Business.
VII. Adjournment of the session.

SEC. 6. The afternoon sessions of the Association shall be devoted to the reading of papers, either entire, by abstract, or by title only, as may

be determined by the Council, to the discussion of such papers, and to voluntary communications when permission to make such voluntary communications has been given by the President with the consent of the Association, except on the last day, when business may be transacted and the minutes adopted.

SEC. 7. The reading of a paper shall not occupy more than thirty minutes, except by permission of the Association.

SEC. 8. No person shall speak more than once, and then not longer than ten minutes, in the discussion of any paper, except by permission of the Association.

SEC. 9. The author of a paper read before the Association shall have the right to close the discussion of such paper.

SEC. 10. No voluntary communication, not announced in the programme, shall exceed fifteen minutes in length, except by permission of the Association; and such voluntary communications may be discussed in accordance with the rules regulating the discussion of papers.

SEC. 11. The President shall call a special meeting of the Association when requested in writing so to do by fifteen members of the Council.

ARTICLE XI.

RULES OF ORDER.

RULE 1. Fifteen Fellows shall constitute a quorum for the transaction of business in morning session, and the presiding officer shall declare any meeting in morning session adjourned when it appears that a quorum is no longer present; but a meeting may be called to order in afternoon session when a quorum is not present.

RULE 2. In the absence of the President and Vice-Presidents, the meeting may elect any Fellow present to act as President *pro tempore*.

RULE 3. When a motion is under debate, no motion shall be received except motions to adjourn, to lay on the table, for the previous question, to postpone, to refer, or to amend, which several motions shall have precedence in the order in which they are enumerated in this Rule.

RULE 4. A motion for the previous question shall not be entertained unless the same be seconded, and supported by at least four additional Fellows present.

RULE 5. Motions to adjourn, to lay on the table, and for the previous question shall be decided without debate.

RULE 6. During the afternoon sessions, a motion to adjourn shall be in order at any time, except while a member has the floor, and such motion shall be decided without debate.

RULE 7. Every Fellow present at a meeting shall vote on all questions in morning sessions, unless excused from voting by the President with the consent of the Association.

RULE 8. The ayes and nays on any question, when called for by five Fellows present, shall be decided without debate, and shall be recorded in full in the minutes.

RULE 9. After a question has been decided in morning session, except one of indefinite postponement, any two Fellows who voted with the majority may, at the same or at any subsequent morning session of the same meeting, move for a reconsideration thereof, without which no discussion of such question shall be allowed.

RULE 10. Every Fellow shall have the right to speak once on any question under consideration, but not oftener, unless by permission of the Association.

RULE 11. All questions of order not provided for in these Rules shall be determined in accordance with the rules of order embodied in Cushing's "Manual of Parliamentary Practice."

ARTICLE XII.

AMENDMENTS.

SECTION 1. Amendments, alterations, or additions to these By-Laws may be made by a three-fourths vote of the Fellows present and voting at a regular annual meeting; provided that notice of such amendments, alterations, or additions shall have been presented in writing at the regular annual meeting immediately preceding.

SEC. 2. These By-Laws, or any Article, or any Section of any Article thereof, may be temporarily suspended at any morning or afternoon session of any regular meeting during such session only, and then only by a three-fourths vote of the Fellows present and voting.

LIST OF FELLOWS.

BY DISTRICT AND COUNTY.

FIRST OR NORTHERN DISTRICT.

FRANKLIN COUNTY.

Founder.	Gillis, William.	Fort Covington.

1

FULTON COUNTY.

Original.	Blake, Clarence R.	Northville.
Founder.	de Zouche, Isaac.	Gloversville.
	Drake, D. Delos.	Johnstown.
	Edwards, John.	Gloversville.

4

HAMILTON COUNTY.

	McGann, Thomas.	Wells.

1

HERKIMER COUNTY.

	Casey, J. E.	Mohawk.
	Douglass, A. J.	Ilion.
	Ellis, J. B.	Little Falls.
	*Fox, Eli.	Mohawk.
	Garlock, William D.	Little Falls.
Original.	Glidden, Charles H.	Little Falls.
	Green, H. H.	Paine's Hollow.
Original.	Potter, Vaughn C.	Starkville.
Original.	Sharer, John P.	Little Falls.
Original.	Southworth, Mark A.	Little Falls.
Original.	Young, John D.	Starkville.

11

*Deceased.

JEFFERSON COUNTY.

Founder.	Abell, Ira H.	Antwerp.
Founder.	Crawe, J. Mortimer.	Watertown.
Original.	Johnson, Parley H.	Adams.

3

LEWIS COUNTY.

	Crosby, Alexander H.	Lowville.
	Douglass, Charles E.	Constableville.
	Joslin, Albert A.	Martinsburgh.
	Kelly, John D.	Lowville.
	Kilborn, Henry F.	Crogham.

5

MONTGOMERY COUNTY.

Original.	Ayres, Douglas.	Fort Plain.
	Caldwell, Nathan A.	Hageman's Mills.
	French, S. H.	Amsterdam.
Original.	Graves, Ezra.	Amsterdam.
Original.	Johnson, Richard G.	Amsterdam.
	Klock, Charles M.	St. Johnsville.
Original.	Leach, H. M.	Glen.
	Parr, John.	Buel.
	Parsons, W. W. D.	Fultonville.
Founder.	Robb, William H.	Amsterdam.
Original.	Rulison, Elbert T.	Amsterdam.
	Simons, Frank E.	Canajoharie.
	Smyth, Arthur V. H.	Minaville.

13

ONEIDA COUNTY.

	Armstrong, James A.	Clinton.
	Babcock, H. E.	New London.
Original.	Bagg, Moses M.	Utica.
	Barnum, D. Albert.	Cassville.
Original.	Blumer, G. Alder.	Utica.
	Bond, George F. M.	Utica.
Original.	Booth, Wilbur H.	Utica.
Original.	Brush, Edward N.	Utica.
	Churchill, Alonzo.	Utica.
	Clarke, Wallace.	Utica.
	Dodge, Amos P.	Oneida Castle.

Douglass, James W. Booneville.
English, G. P. Booneville.
Flandrau, Thomas M. Rome.
Fraser, Jefferson C. Ava.
Fuller, Earl D. Utica.
Gibson, William M. Utica.
Holden, Arthur L. Utica.
Hughes, Henry R. Clinton.
Original. Hunt, James G. Utica.
Kuhn, William. Rome.
Munger, Charles. Knoxboro.
Nelson, William H. Taberg.
Palmer, Henry C. Utica.
Palmer, Walter B. Utica.
Phelps, George G. Utica.
Original. Pilgrim, Charles W. Utica.
Founder. Porter, Harry N. N. Y. Mills.
Quin, Hamilton S. Utica.
Reid, Christopher C. Rome.
Russell, Charles P. Utica.
Sutton, H. C. Rome.
Sutton, Richard E. Rome.
Swartwout, Leander. Prospect.
Tefft, Charles B. Utica.
Wagner, Charles Gray. Utica.
West, Joseph E. Utica.
West, M. Calvin. Rome.

38

OSWEGO COUNTY.

Bacon, Charles G. Fulton.
Bates, Nelson W. Central Square.
Cooley, F. L. Oswego.
Cooley, R. N. Hannibal Centre.
Original. DeWitt, Byron. Oswego.
Huntington, John W. Mexico.
Johnson, George P. Mexico.
Marsh, E. Frank. Fulton.
Todd, John B. Parish.

9

ST. LAWRENCE COUNTY.

Cook, Guy Reuben. Louisville.

1

SECOND OR EASTERN DISTRICT.

ALBANY COUNTY.

Founder. Bailey, Theodore P. Albany.
Haynes, John U. Cohoes.
Founder. Peters, Samuel. Cohoes.
Rulison, L. B. West Troy.
Founder. Sabin, William B. West Troy.
Original. Van Vranken, Adam T. West Troy.
Witbeck, Charles E. Cohoes.
Zeh, Merlin J. West Troy.

8

CLINTON COUNTY.

Founder. Dodge, Lyndhurst C. Rouse's Point.
Founder. Lyon, E. M. Plattsburgh.

2

COLUMBIA COUNTY.

Original. Benham, John C. Hudson.
Bradley, O. Howard. Hudson.
Fritts, Crawford Ellsworth. Hudson.
Original. Lockwood, J. W. Philmont.
Original. Smith, H. Lyle. Hudson.
Vedder, George W. Philmont.
Wheeler, John T. Chatham.
Founder. Wilson, Thomas. Claverack.
Woodruff, R. Allen. Philmont.
Woodworth, T. Floyd. Kinderhook.

10

ESSEX COUNTY.

Founder. Barton, Lyman. Willsborough.
Church, Charles A. Bloomingdale.
Original. D'Avignon, Francis J. Au Sable Forks.
Original. LaBell, Martin J. Lewis.
Original. Pollard, Abiathar. Westport.
Original. Rand, Hannibal W. Keene.
Original. Rice, Isaac. Bloomingdale.
Original. Riley, Andrew W. Au Sable Forks.
Original. Robinson, Ezra A. Jay.
Original. Turner, Melvin H. Hammondsville.

10

GREENE COUNTY.

Original.	Conkling, George.	Durham.
	Getty, A. H.	Athens.
	Howland, George T.	Athens.
	Huestis, W. B.	Kiskatom.
Original.	Selden, O. G.	Catskill.
Original.	Selden, Robert.	Catskill.

6

RENSSELAER COUNTY.

Original.	Allen, Amos.	Grafton Centre.
Founder.	Allen, Charles S.	Greenbush.
	Allen, William L.	Greenbush.
Original.	Baynes, William T.	Troy.
	Bissell, James H.	Troy.
	Bonesteel, H. F.	Troy.
Founder.	Bonesteel, William N.	Troy.
Original.	Bontecou, Reed B.	Troy.
	Boyce, Elias B.	Averill Park.
Founder.	Burbeck, Charles H.	Troy.
Founder.	Burton, Matthew H.	Troy.
Original.	Cooper, William C.	Troy.
Original.	Crombie, Walter C.	Schaghticoke.
	Crounse, Andrew C.	Melrose.
	Dickson, Thomas Gordon.	Troy.
Founder.	Ferguson, E. D.	Troy.
Founder.	Finder, William.	Troy.
	Greenman, C. E.	Troy.
Founder.	Hannan, James C.	Hoosick Falls.
Founder.	Harvie, J. B.	Troy.
Original.	Heimstreet, Thomas B.	Troy.
Original.	Houston, David W.	Troy.
	Hull, William H.	Poestenkill.
	Keith, Halbert Lyon.	West Sand Lake.
	Lamb, Milton M.	Lansingburgh.
Original.	Lyon, George E.	Troy.
	Lyons, Edward L.	Troy.
Original.	Magee, Daniel.	Troy.
	Marsh, James P.	Troy.
	*McTammany, George H.	Troy.
Founder.	Mitchell, Howard E.	Troy.
Founder.	Nichols, Calvin E.	Troy.

*Deceased.

41

Founder. Nichols, William H. West Sand Lake.
Phelan, Michael F. Troy.
Original. Rogers, S. Frank. Troy.
Founder. Rousseau, Zotique. Troy.
Founder. Seymour, W. Wotkyns. Troy.
Original. Skinner, Smith A. Hoosick Falls.
Tompkins, Fred J. Lansingburgh.
Original. Traver, Richard D. Troy.
Ward, R. H. Troy.

41

SARATOGA COUNTY.

Founder. Babcock, Myron N. Saratoga Springs.
Founder. Comstock, George F. Saratoga Springs.
Curtis, P. C. Round Lake.
Original. Dunlop, John J. Waterford.
Gow, Frank F. Schuylerville.
Founder. Grant, Charles S. Saratoga Springs.
Original. Hall, William H. Saratoga Springs.
Founder. Hodgman, William H. Saratoga Springs.
Hudson, George. Stillwater.
Inlay, Erwin G. Conklingville.
Original. Johnson, Ianthus G. Greenfield Centre.
Keefer, Charles W. Mechanicsville.
Kniskern, A. C. Mechanicsville.
Founder. McEwen, Robert C. Saratoga Springs.
Moriarta, D. C. Saratoga Springs.
Original. Murray, Byron J. Saratoga Springs.
Palmer, F. A. Mechanicsville.
Original. Preston, John R. Schuylerville.
Founder. Reynolds, Tabor B. Saratoga Springs.
Rice, George. Mechanicsville.
Original. Sherer, John D. Waterford.
Sherman, F. J. Ballston.
Original. Stubbs, Roland H. Waterford.
Sweetman, J. T., Jr. Ballston.
Webster, W. B. Schuylerville.
Zeh, Edgar. Waterford.

26

SCHENECTADY COUNTY.

Fuller, Robert. Schenectady.
Hammer, Charles. Schenectady.

Original. McDonald, George E. Schenectady.
McDougall, R. A. Duanesburgh.
Original. Reagles, James R. Schenectady.
*Steinführer, Gustavus A. F. Schenectady.
Original. Van Zandt, Henry C. Schenectady.
*Willis, A. B. Schenectady.
8

SCHOHARIE COUNTY.

Original. Hagadorn, William. Gilboa.
Original. Kingsley, Henry F. Schoharie.
2

WARREN COUNTY.

Original. Ferguson, James. Glens Falls.
Fitzgerald, David J. Glens Falls.
Original. Martine, Godfrey R. Glens Falls.
3

WASHINGTON COUNTY.

Lambert, John. Salem.
Long, Alfred J. Whitehall.
2

THIRD OR CENTRAL DISTRICT.

BROOME COUNTY.

Allen, S. P. Whitney's Point.
Founder. Chittenden, Joseph H. Binghamton.
Dudley, Dwight. Maine.
Original. Ely, Henry Oliver. Binghamton.
Farnham, LeRoy D. Binghamton.
Farrington, John M. Binghamton.
Forker, Frederick L. Binghamton.
Greene, Clark W. Chenango Forks.
Original. Hills, Lyman H. Binghamton.
Hough, F. P. Binghamton.
Ingraham, Charles W. Binghamton.
Knapp, W. H. Union Centre.

* Deceased.

Meacham, Isaac D. Binghamton.
Moore, William A. Binghamton.
Founder. Orton, John G. Binghamton.
Pierce, Edward A. Binghamton.
Pierson, G. E. Kirkwood.
Place, John F., Jr. Binghamton.
Founder. Putnam, Frederick W. Binghamton.
Original. Race, W. F. Binghamton.
Founder. Richards, Charles B. Binghamton.
Rodgers, Harris C. Binghamton.
Seymour, Ralph A. Whitney's Point.
Slater, Frank Ellsworth. Binghamton.
Wells, E. H. Binghamton.

25

CAYUGA COUNTY.

Allison, Henry E. Auburn.
Original. Kenyon, M. Moravia.
Original. Laird, William R. Auburn.
Founder. Sawyer, Conant. Auburn.
Original. Tripp, John D. Auburn.

5

CHEMUNG COUNTY.

Original. Brown, Charles W. Elmira.
Original. Ross, Frank W. Elmira.
Squire, Charles L. Elmira.
Original. Wales, Theron A. Elmira.

4

CHENANGO COUNTY.

Original. Blair, Louis P. McDonough.
Original. Brooks, Leroy J. Norwich.
Copley, Herman D. Bainbridge.
Douglas, George. Oxford.
Guy, John D. Coventry.
Hand, S. M. Norwich.
Hayes, Philetus A. Afton.
Original. Johnson, Leonard M. Greene.
Original. Lyman, Elijah S. Sherburne.
Original. Lyman, H. C. Sherburne.
Packer, Thurston G. Smyrna.
Smith, Samuel L. Smithville.

Thompson, R. A. Norwich.
Van Wagner, L. A. Sherburne.
Williams, George O. Greene.
15

CORTLAND COUNTY.

Bradford, George D. Homer.
Original. Clark, DeWitt. Marathon.
Didama, E. A. Cortland.
Founder. Green, Caleb. Homer.
Halbert, M. L. Cincinnatus.
Founder. Hendrick, Henry C. McGrawville.
Higgins, F. W. Cortland.
Founder. Jewett, Homer O. Cortland.
Kenyon, Benjamin. Cincinnatus.
Original. *Smith, Marcellus R. Cincinnatus.
10

DELAWARE COUNTY.

Original. Allaben, Orson M. Margaretville.
Drake, James B. Hancock.
Morrow, William B. Walton.
Smith, George C. Delhi.
Travis, Edward M. Masonville.
5

MADISON COUNTY.

Original. Birdsall, Gilbert. N. Brookfield.
Burhyte, O. W. Brookfield.
Cavana, Martin. Oneida.
Original. Carpenter, Henry W. Oneida.
Drake, Frank C. Oneida.
Original. Nicholson, A. R. Madison.
6

ONONDAGA COUNTY.

Original. Aberdein, Robert. Syracuse.
Founder. Allen, Henry B. Baldwinsville.
Brown, Ulysses H. Syracuse.
Campbell, A. J. Syracuse.
Founder. Dallas, Alexander J. Syracuse.
Founder. Didama, Henry D. Syracuse.

*Deceased.

Original. Donohue, Florence O. Syracuse.
Earle, George W. Tully.
Founder. *Earll, George W. Skaneateles.
Original. Edwards, Amos S. Syracuse.
Original. Edwards, George A. Syracuse.
Founder. Elsner, Henry L. Syracuse.
Flanigan, John R. Syracuse.
Frazee, A. Blair. Elbridge.
Original. Hatch, C. A. Syracuse.
Founder. Head, Adelbert D. Syracuse.
Original. Jacobson, Nathan. Syracuse.
Original. *Knapp, Edwin A. Jamesville.
Founder. Kneeland, Jonathan. South Onondaga.
Magee, Charles M. Syracuse.
Original. McNamara, Daniel. Syracuse.
Original. Munson, W. W. Otisco.
Founder. Parsons, Israel. Marcellus.
Original. Saxer, Leonard A. Syracuse.
Sears, F. W. Syracuse.
Stephenson, F. Halleck. Syracuse.
Founder. Van de Warker, Ely. Syracuse.
Original. Whitford, James. Onondaga Valley.

28

OTSEGO COUNTY.

Original. Barney, C. S. Milford.
Church, B. A. Oneonta.
Ford, M. L. Oneonta.
Founder. Leaning, John K. Cooperstown.
Original. Martin, John H. Otego.
Original. Merritt, George. Cherry Valley.
Original. Sweet, Joseph J. Unadilla.
Sweet, Joshua J. Unadilla.

8

SCHUYLER COUNTY.

Roper, P. B. Alpine.
Smelzer, Baxter T. Havana.

2

SENECA COUNTY.

Bellows, George A. Waterloo.
Blaine, Myron D. Willard.

*Deceased.

Founder. Lester, Elias. Seneca Falls.
Seaman, Frank G. Seneca Falls.
Welles, S. R. Waterloo.
5

TIOGA COUNTY.

Original. Ayer, W. L. Owego.
Cady, George M. Nichols.
Original. Eastman, Robert W. Owego.
3

TOMPKINS COUNTY.

Founder. Beers, John E. Danby.
Biggs, Chauncey P. Ithaca.
Founder. Fitch, William. Dryden.
Flickinger, John. Trumansburg.
4

FOURTH OR WESTERN DISTRICT.

ALLEGANY COUNTY.

Cottrell, A. W. Whitesville.
Original. Stephenson, James A. Scio.
Original. Wakely, Benjamin C. Angelica.
3

CATTARAUGUS COUNTY.

Eddy, John L. Olean.
Ellsworth, Victor A. East Otto.
Lake, Albert D. Perrysburg.
Mudge, Selden J. Olean.
Original. Tompkins, Orren A. East Randolph.
5

CHAUTAUQUA COUNTY.

Founder. Ames, Edward. Sherman.
Bemus, Morris N. Jamestown.
Bemus, William Marvin. Jamestown.
Founder. Chace, William. Mayville.

Founder. Dean, Harmon J. Brocton.
Richmond, Nelson G. Fredonia.
Rolph, R. T. Dunkirk.
Founder. Strong, Thomas D. Westfield.

8

ERIE COUNTY.

Founder. Andrews, Judson B. Buffalo.
Original. Atwood, H. L. Collins Centre.
Original. Banta, Rollin L. Buffalo.
Original. Bartlett, Frederick W. Buffalo.
Original. Bartow, Bernard. Buffalo.
Original. Boies, Loren F. East Hamburgh.
Original. Briggs, Albert H. Buffalo.
Brown, George L. Buffalo.
Burghardt, Francis Augustus. Buffalo.
Original. Burwell, George M. Buffalo.
Founder. Cronyn, John. Buffalo.
Original. Dagenais, Alphonse. Buffalo.
Original. Daniels, Clayton M. Buffalo.
Dayton, C. L. Buffalo.
Original. Dorland, Elias T. Buffalo.
Fell, George E. Buffalo.
Fowler, Joseph. Buffalo.
Frederick, Carlton C. Buffalo.
Gould, Cassius W. Buffalo.
Green, Stephen S. Buffalo.
Original. Greene, DeWitt C. Buffalo.
Founder. Greene, Joseph C. Buffalo.
Original. Greene, Walter D. Buffalo.
Original. Harrington, D. W. Buffalo.
Hartwig, Marcell. Buffalo.
Hayd, Herman E. Buffalo.
Heath, William H. Buffalo.
Founder. Hoyer, F. F. Tonawanda.
Hubbell, Alvin A. Buffalo.
Hunt, H. L. Orchard Park.
Ingraham, Henry D. Buffalo.
Jackson, William H. Springville.
Original. Johnson, Thomas M. Buffalo.
Lapp, Henry. Clarence.
Long, Ben. G. Buffalo.
Macfarlane, William A. Springville.

McPherson, George W. Lancaster.
Original. Murray, William D. Tonawanda.
Park, Roswell. Buffalo.
Original. Pettit, John A. Buffalo.
Phelps, William C. Buffalo.
Pohlman, Julius. Buffalo.
Original. Putnam, James W. Buffalo.
Stockton, Charles G. Buffalo.
Strong, Orville C. Colden.
Taber, R. C. Tonawanda.
Thornton, William H. Buffalo.
Founder. Tremaine, William S. Buffalo.
Trull, H. P. Williamsville.
Twohey, John J. Buffalo.
Original. *Vaughn, Frank O. Buffalo.
Wheeler, Isaac G. Marilla.
Willoughby, M. Buffalo.
Founder. Wyckoff, Cornelius C. Buffalo.

54

GENESEE COUNTY.

Original. Crane, Frank W. Corfu.
Founder. Jackson, Albert P. Oakfield.
Founder. *Sprague, William B. Pavilion.
Stone, Frank L. LeRoy.
Founder. Townsend, Morris W. Bergen.

5

LIVINGSTON COUNTY.

Original. Briggs, William H. Hemlock Lake.
Brown, J. P. Tuscarora.
Dodge, Frank B. Mount Morris.
Jones, George H. Fowlerville.
Kneeland, B. T. Dalton.
Original. Menzie, R. J. Caledonia.
Original. Moyer, Frank H. Moscow.

7

MONROE COUNTY.

Original. Backus, Ogden. Rochester.
Briggs, C. M. Fairport.

* Deceased.

Original.	Buckley, Charles.	Rochester.
Original.	Buckley, James.	Rochester.
Original.	Burke, John J. A.	Rochester.
	Curtis, D. F.	Rochester.
Original.	Dunning, J. D.	Webster.
	Fenno, Henry M.	Rochester.
	Goler, George W.	Rochester.
	Gray, John P.	Rochester.
Founder.	Hovey, B. L.	Rochester.
	Jones, S. Case.	Rochester.
	Maine, Alva P.	Webster.
	McDougall, William D.	Spencerport.
Founder.	Moore, Edward M.	Rochester.
Original.	Moore, Edward M., Jr.	Rochester.
Original.	Moore, Richard Mott.	Rochester.
	Nold, John B.	Rochester.
Original.	O'Hare, Thomas A.	Rochester.
Original.	Pease, Joseph.	Hamlin.
	Preston, B. I.	Rochester.
	Snook, George.	Parma.
	Stockschlaeder, P.	Rochester.

23

NIAGARA COUNTY.

Original.	Clark, Simeon T.	Lockport.
	Eddy, George P.	Lewiston.
	Huggins, William Q.	Sanborn.

3

ONTARIO COUNTY.

Original.	Allen, Duncan S.	Seneca.
Original.	Allen, James H.	Gorham.
Founder.	Bentley, Francis R.	Cheshire.
	*Cruttenden, Albert G.	Clifton Springs.
	De Laney, John Pope.	Geneva.
Original.	Hicks, W. Scott.	Bristol.
Founder.	Nichols, H. W.	Canandaigua.
Founder.	Simmons, E. W.	Canandaigua.
Founder.	*Smith, Joseph T.	Canandaigua.
Original.	Vanderhoof, Frederick D.	Phelps.

10

*Deceased.

ORLEANS COUNTY.

Original. Bailey, William C. Albion.
Founder. Chapman, James. Medina.
Curtis, Daniel. Jeddo.
Original. Taylor, John H. Holley.
Founder. Tompkins, H. C. Knowlesville.

5

STEUBEN COUNTY.

Chittenden, Daniel J. Addison.
Original. Dunn, Jeremiah. Bath.
Original. Ellison, Metler D. Canisteo.
Fowler, Thomas B. Cohocton.
Gilbert, Horatio. Hornellsville.
Hubbard, Chauncey G. Hornellsville.
Hunter, Nathaniel P. Jasper.
Original. Jamison, John S. Hornellsville.
Original. Perry, Nathaniel M. Troupsburgh.
*Van Dusen, Melvin E. Hornellsville.
Wallace, Edwin E. Jasper.

11

WAYNE COUNTY.

Founder. Arnold, J. Newton. Clyde.
Founder. Colvin, Darwin. Clyde.
Horton, David B. Red Creek.
Original. Ingraham, Samuel. Palmyra.
*Lamont, John C. Sodus.
Original. Landon, Newell E. Newark.
Nutten, Wilbur F. Newark.
Original. Sprague, John A. Williamson.
Sprague, L. S. Williamson.
Original. Young, Augustus A. Newark.

10

WYOMING COUNTY.

Original. Ellinwood, A. G. Attica.
Lusk, Zera J. Warsaw.
Original. Palmer, George M. Warsaw.

*Deceased.

Original. Rae, Robert. Portageville.
Rudgers, Denton W. Perry.
5

YATES COUNTY.

Oliver, William. Penn Yan.
*Smith, David M. Penn Yan.
2

FIFTH OR SOUTHERN DISTRICT.

DUTCHESS COUNTY.

Baker, Benjamin N. Rhinebeck.
Original. Barnes, Edwin. Pleasant Plains.
Barton, Thomas J. Tivoli.
Original. Bates, Xyris T. Poughkeepsie.
Original. Bayley, Guy Carleton. Poughkeepsie.
Bird, J. S. Hyde Park.
Founder. Codding, George H. Amenia.
Founder. Cramer, William. Poughkeepsie.
Original. Fletcher, Charles L. Wing's Station.
Julian, John M. Moore's Mill.
Founder. Kittredge, Charles S. Fishkill-on-Hudson.
Founder. Leroy, Irving D. Pleasant Valley.
Founder. Porteous, James G. Poughkeepsie.
Founder. Pultz, Monroe T. Stanfordville.
Original. Van Wyck, Richard C. Hopewell Junction.
Original. Young, John. Fishkill-on-Hudson.
16

KINGS COUNTY.

Founder. Baker, George W. Brooklyn, E. D.
Bell, A. Nelson. Brooklyn.
Benton, Stuart H. Brooklyn.
Bierwirth, Julius C. Brooklyn.
Original. Biggam, William H., Jr. Brooklyn.
Original. Brundage, Amos H. Brooklyn.
Original. Conway, John Francis. Brooklyn.
Creamer, Joseph. Brooklyn, E. D.

* Deceased.

Creamer, Joseph, Jr. Brooklyn, E. D.
Criado, Louis F. Brooklyn.
Feeley, James F. Brooklyn, E. D.
Gardiner, William F. Brooklyn.
Hughes, Peter. Brooklyn.
Original. Ilgen, Ernest. Brooklyn.
Original. Jenkins, John A. Brooklyn, E. D.
Jewett, F. A. Brooklyn.
Original. Leighton, Nathaniel W. Brooklyn.
Little, Frank. Brooklyn.
Original. Lloyd, T. Mortimer. Brooklyn.
Original. Lung, Jesse B. Brooklyn.
Original. McCollom, William. Brooklyn.
Original. Minard, E. J. Chapin. Brooklyn.
Original. North, Nelson L. Brooklyn.
Ostrander, George A. Brooklyn.
Original. Paine, Arthur R. Brooklyn.
Original. Pray, S. R. Brooklyn.
Price, Henry R. Brooklyn.
Reed, Henry B. Brooklyn.
Risch, Henry F. W. Brooklyn.
Rochester, Thomas M. Brooklyn.
Founder. Rushmore, John D. Brooklyn.
Original. Russell, William G. Brooklyn.
Founder. Segur, Avery. Brooklyn.
Original. Shepard, A. Warren. Brooklyn.
Original. Sizer, Nelson Buell de S. Brooklyn.
Founder. Squibb, Edward H. Brooklyn.
Founder. Squibb, Edward R. Brooklyn.
Original. Steinke, Carl Otho Hermann. Brooklyn.
Sullivan, John D. Brooklyn.
Original. Thayer, William Henry. Brooklyn.
Thwing, Clarence. Brooklyn.
Vanderveer, J. R. Brooklyn.
Waterworth, William. Brooklyn.
Original. Wieber, George. Brooklyn.
Original. Williams, William H. Brooklyn.
Founder. Wyckoff, Richard M. Brooklyn.

46

NEW YORK COUNTY.

Adams, Calvin Thayer. New York.
Agramonte, E. V. New York.
Original. Allen, S. Busby. New York.

	Allen, Thomas H.	New York.
	Arango, Augustin.	New York.
Original.	Arcularius, Lewis.	New York.
	Armstrong, S. T.	New York.
Original.	Arnold, Edmund S. F.	New York.
	Arnold, Glover C.	New York.
	Baldwin, F. A.	New York.
	Ballou, William R.	New York.
Original.	*Bathgate, James.	Morrisania, New York.
	Bermingham, Edward J.	New York.
Original.	Biggs, Herman M.	New York.
Founder.	Bozeman, Nathan.	New York.
	Bozeman, Nathan G.	New York.
	Broderick, William P.	New York.
Original.	Bryant, Joseph D.	New York.
Original.	Buchanan, Alexander.	New York.
Original.	Bull, Charles Stedman.	New York.
	Bull, William T.	New York.
Original.	Burchard, Thomas H.	New York.
Founder.	Carroll, Alfred Ludlow.	New York.
Original.	Carter, H. Skelton.	New York.
Original.	Chauveau, Jean F.	New York.
Original.	Chrystie, T. M. Ludlow.	New York.
	Clymer, Meredith.	New York.
	Collins, Stacy B.	New York.
	Comfort, John E.	New York.
Founder.	Conover, William S.	New York.
	Conway, John R.	New York.
Original.	Curry, Walker.	New York.
	Damainville, Lucien.	King's Bridge.
	Davis, J. Griffith.	New York.
	Davis, Robert C.	New York.
Original.	Denison, C. Ellery.	New York.
Original.	Denison, Ellery.	New York.
Founder.	Dennis, Frederic S.	New York.
	de Quesada, Gregorio J.	New York.
Founder.	*Du Bois, Abram.	New York.
Original.	Du Bois, Mathew B	New York.
	Dudley, A. Palmer.	New York.
	Dunham, Edward K.	New York.
Original.	Eliot, Ellsworth.	New York.
	Erdmann, John F.	New York.
	Farrington, Joseph O.	New York.

*Deceased.

Field, Matthew D. New York.
Flinn, Thomas W. P. New York.
Founder. Flint, Austin. New York.
Founder. Flint, William H. New York.
Fogg, John S. New York.
Foster, George V. New York.
Frankenberg, Jacob H. New York.
Original. Furman, Guido. New York.
Original. *Garrish, John P. New York.
Gleitsmann, J. W. New York.
Goldthwaite, Henry. New York.
Founder. Gouley, John W. S. New York.
Grauer, Frank. New York.
Hammond, Frederick Porter. New York.
Original. Harrison, George Tucker. New York.
Haubold, H. A. New York.
Hillis, Thomas J. New York.
Founder. Hinton, John H. New York.
Founder. Hodgman, Abbott. New York.
Holmes, Martha C. New York.
Hubbard, Dwight L. New York.
Hubbard, George E. New York.
Founder. Hubbard, Samuel T. New York.
Founder. Janeway, Edward G. New York.
Janvrin, J. E. New York.
Jenkins, William T. New York.
Kessler, Adolph. New York.
King, Ferdinand. New York.
Kneer, F. G. New York.
Knipe, George. New York.
Founder. Leale, Charles A. New York.
Lewis, Robert. New York.
Lockwood, Charles E. New York.
Ludlow, Ogden C. New York.
Lukens, Anna. New York.
Founder. Lusk, William T. New York.
Lynch, Patrick J. New York.
MacGregor, James R. New York.
Mackenzie, J. C. New York.
McBurney, Charles. New York.
McGillicuddy, T. J. New York.
McGowan, John P. New York.
McIlroy, Samuel H. New York.

* Deceased.

McLeod, Johnston. New York.
Founder. McLeod, S. B. Wylie. New York.
Original. McLochlin, James A. New York.
Original. McNamara, Laurence J. New York.
Founder. Manley, Thomas H. New York.
Marshall, Francis F. New York.
Matthews, David. New York.
Maury, Rutson. New York.
Meier, Gottlieb C. H. New York.
Original. Miller, William T. New York.
Milliken, S. E. New York.
Original. Miranda, Ramon L. New York.
Original. Mitchell, Hubbard W. New York.
Moran, James. New York.
Mott, Valentine. New York.
Original. Murphy, John. New York.
Original. Murray, Sandford J. New York.
Original. Newman, Robert. New York.
Founder. Nicoll, Henry D. New York.
Original. Obendorfer, Isidor P. New York.
O'Brien, Frederick William. New York.
Ochs, Benjamin F. New York.
Oppenheimer, H. S. New York.
Palmer, Edmund J. New York.
Original. Parsons, John. New York.
Perry, John Gardner. New York.
Phelps, Charles. New York.
Original. Pooler, Hiram A. New York.
Original. Porter, P. Brynberg. New York.
Pritchard, R. L. New York.
Founder. Purple, Samuel S. New York.
Ransom, H. B. New York.
Read, Ira B. New York.
Original. Ricketts, Benjamin M. New York.
Roth, Julius A. New York.
Ruggles, Augustus D. New York.
Original. Sabine, Gustavus A. New York.
Sanders, E. New York.
Founder. Sayre, Lewis A. New York.
Sayre, Reginald H. New York.
Shaw, Henry B. New York.
Shrady, John. New York.
Shunk, Albert. New York.
Silver, Henry M. New York.

Small, John W. New York.
Smeallie, James A. New York.
Original. Smith, J. Lewis. New York.
Original. Smith, Samuel W. New York.
Original. Smith, Stephen. New York.
Spicer, Walter E. New York.
Founder. Thomas, T. Gaillard. New York.
Tiemann, Paul E. New York.
Truax, J. G. New York.
Founder. Tucker, Carlos P. New York.
Van Fleet, Frank. New York.
Vincent, Ludger C. New York.
Original. Wallach, Joseph G. New York.
Walsh, Simon J. New York.
Founder. Ward, Charles S. New York.
Warner, Frederic M. New York.
Warner, John W. New York.
Weston, Albert T. New York.
White, Charles B. New York.
White, J. Blake. New York.
Founder. White, Whitman V. New York.
Founder. White, William T. New York.
Founder. Wiener, Joseph. New York.
Williamson, Edward A. New York.
Woodend, William E. New York.
Original. Wyeth, John A. New York.

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ORANGE COUNTY.

Conner, Milton C. Middletown.
Original. Hunt, James H. Port Jervis.
Potts, E. Port Jervis.
Swartwout, H. B. Port Jervis.

4

PUTNAM COUNTY.

Founder. Murdock, George W. Cold Spring.
Founder. Young, William. Cold Spring.

2

QUEENS COUNTY.

Original. Burns, William J. Roslyn.
Original. Rave, Edward G. Oyster Bay.

2

42

RICHMOND COUNTY.

Founder. Johnston, Francis U. New Brighton.
Kinyoun, Joseph J. Stapleton.
Martindale, F. E. Port Richmond.
Walser, William C. Port Richmond.
4

ROCKLAND COUNTY.

Founder. Govan, William. Stony Point.
1

SUFFOLK COUNTY.

Original. Banks, George B. Huntington.
Original. Chambers, Martin L. Port Jefferson.
Hamill, Edward H. Newark, N. J.
Hulse, William A. Bay Shore.
Original. Lindsay, Wallie. Huntington.
Founder. Woodend, William D. Huntington.
6

SULLIVAN COUNTY.

Original. Bennett, Thomas W. Jeffersonville.
Crocker, Edwin. Narrowsburgh.
DeKay, William H. Parksville.
Johnston, N. B. Barryville.
McWilliams, F. A. Monticello.
Original. Munson, J. A. Grahamsville.
Piper, Charles W. Wurtsborough.
7

ULSTER COUNTY.

Original. Chambers, Jacob. Kingston.
Original. HoornBeek, Philip Du Bois. Wawarsing.
Founder. Hühne, August. Rondout.
Original. Hühne, Frederick. Rondout.
Original. Van Hoevenberg, Henry. Kingston.
Ward, John J. Ellenville.
6

WESTCHESTER COUNTY.

Acker, Thomas J. Croton Landing.
Original. Brush, Edward F. Mount Vernon.

Original.	Coutant, Richard B.	Tarrytown.
	Dunham, Theodore.	Irvington.
Original.	Furman, J. Henry.	Tarrytown.
	Granger, William D.	Mount Vernon.
Original.	Huntington, Henry K.	New Rochelle.
Founder.	Husted, Nathaniel C.	Tarrytown.
Original.	Lyons, G. A.	New Rochelle.
Original.	Schmid, H. Ernest.	White Plains.
Original.	Southworth, Richmond Joseph.	Yonkers.
Original.	Wells, William L.	New Rochelle.

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SUMMARY OF FELLOWSHIP BY DISTRICT.

First District,	86
Second District,	118
Third District,	120
Fourth District,	151
Fifth District,	265
Total Fellowship,	740

ALPHABETICAL LIST OF FELLOWS.

Abell, Ira H., Antwerp, Jefferson Co. Founder.
Aberdein, Robert, 2 Greeley Block, Syracuse, Onondaga Co. Original.
Acker, Thomas J., Croton Landing, Westchester Co.
Adams, Calvin Thayer, 200 W. 55th St., New York, New York Co.
Agramonte, E. V., 435 W. 22d St., New York, New York Co.
Allaben, Orson M., Margaretville, Delaware Co. Original.
Allen, Amos, Grafton, Rensselaer Co. Original.
Allen, Charles S., Greenbush, Rensselaer Co. Founder.
Allen, Duncan S., Seneca, Ontario Co. Original.
Allen, Henry B., Baldwinsville, Onondaga Co. Founder.
Allen, James H., Gorham, Ontario Co. Original.
Allen, S. Busby, 145 E. 83d St., New York, New York Co. Original.
Allen, S. P., Whitney's Point, Broome Co.
Allen, Thomas H., 52 W. 45th St., New York, New York Co.
Allen, William L., Greenbush, Rensselaer Co.
Allison, Henry E., Asylum for Insane Criminals, Auburn, Cayuga Co.
Ames, Edward, Sherman, Chautauqua Co. Founder.
Andrews, Judson B., State Hospital, Buffalo, Erie Co. Founder.
Arango, Augustin, 125 E. 36th St., New York, New York Co.
Arcularius, Lewis, 121 E. 25th St., New York, New York Co. Original.
Armstrong, James A., Clinton, Oneida Co.
Armstrong, S. T., 166 W. 54th St., New York, New York Co.
Arnold, Edmund S. F., 64 Madison Ave., New York, New York Co Original.
Arnold, Glover C., 115 E. 30th St., New York, New York Co.
Arnold, J. Newton, Clyde, Wayne Co. Founder.
Atwood, H. L., Collins Centre, Erie Co. Original.
Ayer, W. L., Owego, Tioga Co. Original.
Ayres, Douglas, Fort Plain, Montgomery Co. Original.
Babcock, H. E., New London, Oneida Co. Original.
Babcock, Myron N., Saratoga Springs, Saratoga Co. Founder.
Backus, Ogden, 67 S. Fitzhugh St., Rochester, Monroe Co. Original.
Bacon, Charles G., Fulton, Oswego Co. (Retired list.)
Bagg, Moses M., Utica, Oneida Co. Original. (Retired list.)
Bailey, Theodore P., 95 Eagle St., Albany, Albany Co. Founder.
Bailey, William C., Albion, Orleans Co. Original.
Baker, Benjamin N., Rhinebeck, Dutchess Co.

Baker, George W., 540 Bedford Ave., Brooklyn, E. D., Kings Co. Founder.
Baldwin, F. A., 329 W. 23d St., New York, New York Co.
Ballou, William R., 102 E. 31st St., New York, New York Co.
Banks, George B., Hartsdale, Westchester Co. Original.
Banta, Rollin L., 330 Elk St., Buffalo, Erie Co. Original.
Barnes, Edwin, Pleasant Plains, Dutchess Co. Original.
Barney, Charles S., Milford, Otsego Co. Original.
Barnum, D. Albert, Cassville, Oneida Co.
Bartlett, Frederick W., 112 Ellicott St., Buffalo, Erie Co. Original.
Barton, Lyman, Willsborough, Essex Co. Founder. (Retired list.)
Barton, Thomas J., Tivoli, Dutchess Co.
Bartow, Bernard, 220 Franklin St., Buffalo, Erie Co.
Bates, Nelson W., Central Square, Oswego Co.
Bates, Xyris T., Poughkeepsie, Dutchess Co. Original.
*Bathgate, James, Fordham Ave., Morrisania, New York, New York Co. Original.
Bayley, Guy Carleton, Poughkeepsie, Dutchess Co. Original.
Baynes, William T., 2419 5th Ave., Troy, Rensselaer Co. Original.
Beers, John E., Danby, Tompkins Co. Founder.
Bell, A. Nelson, 291 Union St., Brooklyn, Kings Co.
Bellows, George A., Waterloo, Seneca Co.
Bemus, Morris N., Jamestown, Chautauqua Co.
Bemus, Wm. Marvin, Jamestown, Chautauqua Co.
Benham, John C., Hudson, Columbia Co. Original.
Bennett, Thomas W., Jeffersonville, Sullivan Co. Original.
Bentley, Francis R., Cheshire, Ontario Co. Original. (Retired list.)
Benton, Stuart H., 1063 Bergen St., Brooklyn, Kings Co.
Bermingham, Edward J., 23 E. 46th St., New York, New York Co.
Bierwirth, Julius C., 137 Montague St., Brooklyn, Kings Co.
Biggam, William H., Jr., 636 St. Mark's Ave., Brooklyn, King's Co. Original.
Biggs, Chauncey P., 14 E. Seneca St., Ithaca, Tompkins Co.
Biggs, Hermann M., 58 E. 25th St., New York, New York Co. Original.
Bird, J. S., Hyde Park, Dutchess Co.
Birdsall, Gilbert, North Brookfield, Madison Co. Original.
Bissell, James H., 2187 5th Ave., Troy, Rensselaer Co.
Blaine, Myron D., Willard, Seneca Co.
Blair, Louis P., McDonough, Chenango Co. Original.
Blake, Clarence R., Northville, Fulton Co. Original.
Blumer, G. Alder, State Hospital, Utica, Oneida Co. Original.
Boies, Loren F., 286 Howard Ave., Buffalo, Erie Co. Original.
Bond, G. F. M., State Hospital, Utica, Oneida Co.

* Deceased.

Bonesteel, H. F., Mill St., Troy, Rensselaer Co.
Bonesteel, William N., Mill St., Troy, Rensselaer Co. Founder. (Retired list.)
Bontecou, Reed B., 82 4th St., Troy, Rensselaer Co. Original.
Booth, Wilbur H., 172 Genesee St., Utica, Oneida Co. Original.
Boyce, Elias B., Averill Park, Rensselaer Co.
Bozeman, Nathan, 9 W. 31st St., New York, New York Co. Founder.
Bozeman, Nathan G., 9 W. 31st St., New York, New York Co.
Bradford, George D., Homer, Cortland Co.
Bradley, O. Howard, Hudson, Columbia Co.
Briggs, Albert H., 267 Hudson St., Buffalo, Erie Co. Original.
Briggs, C. M., Fairport, Monroe Co.
Briggs, William H., Hemlock Lake, Livingston Co. Original.
Broderick, William P., 272 Willis Ave., New York, New York Co.
Brooks, Leroy J., Norwich, Chenango Co. Original.
Brown, Charles W., 902 14th St., N. W., Washington, D. C. Original.
Brown, George L., 173 Niagara St., Buffalo, Erie Co.
Brown, J. P., Tuscarora, Livingston Co.
Brown, Ulysses H., 312 Warren St., Syracuse, Onondaga Co.
Brundage, Amos H., 609 Madison St., Brooklyn, Kings Co. Original.
Brush, Edward F., Mount Vernon, Westchester Co. Original.
Brush, Edward N., Shepperd Asylum, Towson, Md. Original.
Bryant, Joseph D., 54 W. 36th St., New York, New York Co. Original.
Buchanan, Alexander, 358 W. 30th St., New York, New York Co. Original.
Buckley, Charles, 127 E. Main St., Rochester, Monroe Co. Original.
Buckley, James, 127 E. Main St., Rochester, Monroe Co. Original.
Bull, Charles Stedman, 47 W. 36th St., New York, New York Co. Original.
Bull, William T., 35 W. 35th St., New York, New York Co.
Burbeck, Charles H., 91 First St., Troy, Rensselaer Co. Founder.
Burchard, Thomas H., 7 E. 48th St., New York, New York Co. Original.
Burghardt, Francis Augustus, 632 Elm St., Buffalo, Erie Co.
Burhyte, O. W., Brookfield, Madison Co.
Burke, John J. A., 65 East Ave., Rochester, Monroe Co. Original.
Burns, Wm. J., Roslyn, Queens Co. Original.
Burton, Matthew H., 75 4th St., Troy, Rensselaer Co. Founder.
Burwell, George N., 130 Pearl St., Buffalo, Erie Co. Original.
Cady, George M., Nichols, Tioga Co.
Caldwell, Nathan A., Hageman's Mills, Montgomery Co.
Campbell, A. J., 332 Warren St., Syracuse, Onondaga Co.
Carpenter, Henry W., Oneida, Madison Co. Original.
Carroll, Alfred Ludlow, 30 W. 59th St., New York, New York Co.
Carter, H. Skelton, 130 E. 24th St., New York, New York Co. Original.

Casey, J. E., Mohawk, Herkimer Co.
Cavana, Martin, Oneida, Madison Co.
Chace, William, Mayville, Chautauqua Co. Founder.
Chambers, Jacob, Kingston, Ulster Co. Original.
Chambers, Martin L., Port Jefferson, Suffolk Co. Original.
Chapman, James, Medina, Orleans Co. Founder.
Chauveau, Jean F., 31 W. 60th St., New York, New York Co. Original.
Chittenden, Daniel J., Addison, Steuben Co.
Chittenden, Joseph H., Binghamton, Broome Co. Founder.
Chrystie, T. M. Ludlow, 216 W. 46th St., New York, New York Co. Original.
Church, B. A., Oneonta, Otsego Co.
Church, Charles A., Bloomingdale, Essex Co.
Churchill, Alonzo, 189 Genesee St., Utica, Oneida Co. (Retired list.)
Clark, Dewitt C., Marathon, Cortland Co. Original.
Clark, Simeon Tucker, Lockport, Niagara Co. Original.
Clarke, Wallace, 136 Park Ave., Utica, Oneida Co.
Clymer, Meredith, 65 W. 38th St., New York, New York Co.
Codding, George H., Amenia, Dutchess Co. Founder.
Collins, Stacy B., 106 E. 35th St., New York, New York Co.
Colvin, Darwin, Clyde, Wayne Co. Founder.
Comfort, John E., 1315 Franklin Ave., New York, New York Co.
Comstock, George F., Saratoga Springs, Saratoga Co. Founder.
Conkling, George, Durham, Greene Co. Original.
Conner, Milton C., Middletown, Orange Co.
Conover, William S., 205 W. 133d St., New York, New York Co. Founder.
Conway, John Francis, cor. Buffalo and Union Sts., Brooklyn, Kings Co. Original.
Conway, John R., 14 Lexington Ave., New York, New York Co.
Cook, Guy Reuben, Louisville, St. Lawrence Co.
Cooley, F. L., 210 First St., Oswego, Oswego Co.
Cooley, R. N., Hannibal Centre, Oswego Co.
Cooper, William C., 81 3d St., Troy, Rensselaer Co. Original.
Copley, Herman D., Bainbridge, Chenango Co.
Cottrell, A. W., Myerstown, Lebanon Co., Pa.
Coutant, Richard B., Tarrytown, Westchester Co. Original.
Cramer, William, 136 Mansion St., Poughkeepsie, Dutchess Co. Founder.
Crane, Frank W., Corfu, Genesee Co. Original.
Crawe, J. Mortimer, Watertown, Jefferson Co. Founder.
Creamer, Joseph, 154 Hewes St., Brooklyn, E. D., Kings Co.
Creamer, Joseph, Jr., 168 N. 6th St., Brooklyn, E. D., Kings Co.
Criado, Louis F., 147 Fort Green Place, Brooklyn, Kings Co.
Crocker, Edwin, Narrowsburgh, Sullivan Co.

Crombie, Walter C., Schaghticoke, Rensselaer Co. Original.
Cronyn, John, 55 W. Swan St., Buffalo, Erie Co. Founder.
Crosby, Alexander H., Lowville, Lewis Co.
Crounse, Andrew C., Melrose, Rensselaer Co.
* Cruttenden, Albert G., Clifton Springs, Ontario Co.
Curry, Walker, 21 E. 61st St., New York, New York Co. Original.
Curtis, Daniel, Jeddo, Orleans Co.
Curtis, D. F., 95 South Ave., Rochester, Monroe Co.
Curtis, P. C., Round Lake, Saratoga Co.
Dagenais, Alphonse, 473 W. Virginia St., Buffalo, Erie Co. Original.
Dallas, Alexander J., 48 Warren St., Syracuse, Onondaga Co. Founder.
Damainville, Lucien, 3007 Broadway, New York, New York Co.
Daniels, Clayton M., 82 N. Pearl St., Buffalo, Erie Co. Original.
D'Avignon, Francis J., Au Sable Forks, Essex Co. Original.
Davis, J. Griffith, 132 W. 12th St., New York, New York Co.
Davis, Robert C., 150 E. 128th St., New York, New York Co.
Dayton, C. L., 246 Dearborn St., Buffalo, Erie Co. (Retired list.)
Dean, Harmon J., Brocton, Chautauqua Co. Founder.
DeKay, William H., Parksville, Sullivan Co.
De Laney, John Pope, Geneva, Ontario Co.
Denison, Charles Ellery, 124 W. 13th St., New York, New York Co. Original.
Denison, Ellery, 124 W. 13th St., New York, New York Co. Original.
Dennis, Frederic S., 542 Madison Ave., New York, New York Co. Founder.
de Quesada, Gregorio J., 307 W. 28th St., New York, New York Co.
De Witt, Byron, Oswego, Oswego Co. Original.
de Zouche, Isaac, Gloversville, Fulton Co. Founder.
Dickson, Thomas Gordon, Troy, Rensselaer Co.
Didama, Emory A., Cortland, Cortland Co.
Didama, Henry D., 112 S. Salina St., Syracuse, Onondaga Co. Founder.
Dodge, Amos P., Oneida Castle, Oneida Co.
Dodge, Frank B., Mount Morris, Livingston Co.
Dodge, Lyndhurst C., Rouse's Point, Clinton Co. Founder.
Donohue, Florence O., 312 S. Salina St., Syracuse, Onondaga Co. Original.
Dorland, Elias T., 86 N. Division St., Buffalo, Erie Co. Original.
Douglas, George, Oxford, Chenango Co.
Douglass, A. J., Ilion, Herkimer Co.
Douglass, Charles E., Constableville, Lewis Co.
Douglass, James W., Booneville, Oneida Co.
Drake, D. Delos, Johnstown, Fulton Co.
Drake, Frank C., Oneida, Madison Co.

* Deceased.

Drake, James B., Hancock, Delaware Co.
*Du Bois, Abram, 16 W. 30th St., New York, New York Co. Founder.
Du Bois, Matthew B., 41 W. 33d St., New York, New York Co. Original.
Dudley, A. Palmer, 640 Madison Ave., New York, New York Co.
Dudley, Dwight, Maine, Broome Co.
Dunham, Edward K., 53 E. 30th St., New York, New York Co.
Dunham, Theodore, 347 Lexington Ave., New York, New York Co.
Dunlop, John J., Waterford, Saratoga Co. Original.
Dunn, Jeremiah, Bath, Steuben Co. Original.
Dunning, J. D., Webster, Monroe Co. Original.
Earle, George W., Tully, Onondaga Co.
*Earll, George W., Skaneateles, Onondaga Co. Founder.
Eastman, Robert W., Owego, Tioga Co. Original.
Eddy, George P., Lewiston, Niagara Co.
Eddy, John L., Olean, Cattaraugus Co.
Edwards, Amos S., 1506 N. Salina St., Syracuse, Onondaga Co. Original.
Edwards, George A., Catherine and Lodi Sts., Syracuse, Onondaga Co. Original.
Edwards, John, Gloversville, Fulton Co.
Eliot, Ellsworth, 48 W. 36th St., New York, New York Co. Original.
Ellinwood, A. G., Attica, Wyoming Co. Original.
Ellis, J. B., Little Falls, Herkimer Co.
Ellison, Metler D., Canisteo. Steuben Co. Original.
Ellsworth, Victor A., East Otto, Cattaraugus Co.
Elsner, Henry L., 308 N. Salina St., Syracuse, Onondaga Co. Founder.
Ely, Henry Oliver, Binghamton, Broome Co. Original.
English, G. P., Booneville, Oneida Co.
Erdmann, John F., 159 Lexington Ave., New York, New York Co.
Farnham, LeRoy D., Binghamton, Broome Co.
Farrington, John M., Binghamton, Broome Co.
Farrington, Joseph O., 1991 Madison Ave., New York, New York Co.
Feely, James F., 296 Lorimer St., Brooklyn, E. D., Kings Co.
Fell, George E., 72 Niagara St., Buffalo, Erie Co.
Fenno, Henry Marshall, 77 W. Main St., Rochester, Monroe Co.
Ferguson, E. D., 1 Union Place, Troy, Rensselaer Co. Founder.
Ferguson, James, Glens Falls, Warren Co. Original. (Retired list.)
Field, Mathew D., 115 E. 40th St., New York, New York Co.
Finder, William, Jr., 2 Union Place, Troy, Rensselaer Co. Founder.
Fitch, William, Dryden, Tompkins Co. Founder.
Fitzgerald, David J., Glens Falls, Warren Co.
Flandrau, Thomas M., Rome, Oneida Co.
Flanigan, John R., Syracuse, Onondaga Co.

*Deceased.

Fletcher, Charles L., Wing's Station, Dutchess Co. Original.
Flickinger, John, Trumansburg, Tompkins Co.
Finn, Thomas W. P., 137 E. 28th St., New York, New York Co.
Flint, Austin, 14 W. 33d St., New York, New York Co. Founder.
Flint, William H., 37 E. 33d St., New York, New York Co. Founder.
Fogg, John S., N. Y. City Asyl., Ward's Isl'd, New York, New York Co.
Ford, M. L., Oneonta, Otsego Co.
Forker, Frederick, Binghamton, Broome Co.
Foster, George V., 109 E. 18th St., New York, New York Co.
Fowler, Joseph, 31 Church St., Buffalo, Erie Co.
Fowler, Thomas B., Cohocton, Steuben Co.
*Fox, Eli, Mohawk, Herkimer Co.
Frankenberg, Jacob H., 142 E. 74th St., New York, New York Co.
Fraser, Jefferson C., Ava, Oneida Co.
Frazee, A. Blair, Kipple, Pa.
Frederick, Carlton C., 64 Richmond Ave., Buffalo, Erie Co.
French, S. H., Amsterdam, Montgomery Co.
Fritts, Crawford Ellsworth, Hudson, Columbia Co.
Fuller, Earl D., 66 Varick St., Utica, Oneida Co.
Fuller, Robert, Schenectady, Schenectady Co.
Furman, Guido, 125 W. 73d St., New York, New York Co. Original.
Furman, J. Henry, Tarrytown, Westchester Co. Original.
Gardner, W. J., 175 6th Ave., Brooklyn, Kings Co.
Garlock, William D., Little Falls, Herkimer Co.
*Garrish, John P., 2147 7th Ave., New York, New York Co. Original.
Getty, A. H., Athens, Greene Co.
Gibson, William M., 187 Genesee St., Utica, Oneida Co.
Gilbert, Horatio, Hornellsville, Steuben Co.
Gillis, William, Fort Covington, Franklin Co. Founder.
Gleitsmann, J. W., 46 E. 25th St., New York, New York Co.
Glidden, Charles H., Little Falls, Herkimer Co. Original.
Goldthwaite, Henry, Fifth Avenue Hotel, New York, New York Co.
Goler, George W., 54 S. Fitzhugh St., Rochester, Monroe Co.
Gould, Cassius W., 1428 Main St., Buffalo, Erie Co.
Gouley, John W. S., 324 Madison Ave., New York, New York Co.
Founder.
Govan, William, Stony Point, Rockland Co. Founder.
Gow, Frank F., Schuylerville, Saratoga Co.
Granger, William D., Bronxville (Vernon House), Westchester Co.
Grant, Charles S., Saratoga Springs, Saratoga Co. Founder.
Grauer, Frank, 326 W. 46th St , New York, New York Co.
Graves, Ezra, Amsterdam, Montgomery Co. Original.
Gray, John P., 270 Alexander Ave., Rochester, Monroe Co.

*Deceased.

Green, Caleb, Homer, Cortland Co. Founder.
Green, H. H., Paine's Hollow, Herkimer Co.
Green, Stephen S., 384 Swan St., Buffalo, Erie Co.
Greene, Clark W., Chenango Forks, Broome Co.
Greene, De Witt C., 124 Swan St., Buffalo, Erie Co. Original.
Greene, Joseph C., 124 Swan St., Buffalo, Erie Co. Founder.
Greene, Walter D., 444 Elk St., Buffalo, Erie Co. Original.
Greenman, C. E., 575 1st St., Troy, Rensselaer Co.
Guy, J. D., Coventry, Chenango Co.
Hagadorn, William, Gilboa, Schoharie Co. Original.
Halbert, M. L., Cincinnatus, Cortland Co.
Hall, William H., Saratoga Springs, Saratoga Co. Original.
Hamill, Edward H., 878 Broad St., Newark, New Jersey.
Hammer, Charles, Schenectady, Schenectady Co.
Hammond, Frederick Porter, 1427 Washington Ave., New York, New York Co.
Hand, S. M., Norwich, Chenango Co.
Hannan, James C., Hoosick Falls, Rensselaer Co. Founder.
Harrington, D. W., 1430 Main St., Buffalo, Erie Co. Original.
Harrison, George Tucker, 221 W. 23d St., New York, New York Co. Original.
Hartwig, Marcell, 38 E. Huron St., Buffalo, Erie Co.
Harvie, J. B., 6 Clinton Place, Troy, Rensselaer Co. Founder.
Hatch, C. A., 110 E. Onondaga St., Syracuse, Onondaga Co. Original.
Haubold, H. A., 225 E. 72d St., New York, New York Co.
Hayd, Herman E., 78 Niagara St., Buffalo, Erie Co.
Hayes, Philetus A., Afton, Chenango Co.
Haynes, John U., 103 Mohawk St., Cohoes, Albany Co.
Head, Adelbert D., 322 S. Salina St., Syracuse, Onondaga Co. Founder.
Heath, William H., 415 Pearl St., Buffalo, Erie Co.
Heimstreet, Thomas B., 14 Division St., Troy, Rensselaer Co. Original.
Hendrick, Henry C., McGrawville, Cortland Co. Founder.
Hicks, W. Scott, Bristol, Ontario Co. Original.
Higgins, F. W., Cortland, Cortland Co.
Hillis, Thomas J., 51 Charlton St., New York, New York Co.
Hills, Lyman H., Binghamton, Broome Co. Original.
Hinton, John H., 41 W. 32d St., New York, New York Co. Founder.
Hodgman, Abbott, 141 E. 38th St., New York, New York Co. Founder.
Hodgman, William H., 109 Caroline St., Saratoga Springs, Saratoga Co. Founder.
Holden, Arthur L., 116 South St., Utica, Oneida Co.
Holmes, Martha C., 19 E. 127th St., New York, New York Co.
HoornBeek, Philip Du Bois, Wawarsing, Ulster Co. Original. (Retired list.)

Horton, David B., Red Creek, Wayne Co.
Hough, F. P., Binghamton, Broome Co.
Houston, David W., 44 2d Street, Troy, Rensselaer Co. Original.
Hovey, B. L., 34 N. Fitzhugh St., Rochester, Monroe Co. Founder.
Howland, George T., Athens, Greene Co.
Hoyer, F. F., Tonawanda, Erie Co. Founder.
Hubbard, Chauncey G., Hornellsville, Steuben Co.
Hubbard, Dwight L., 344 W. 33d St., New York, New York Co.
Hubbard, George E., 257 W. 52d St., New York, New York Co.
Hubbard, Samuel T., 27 W. 9th St., New York, New York Co. Founder.
Hubbell, Alvin A., 212 Franklin St., Buffalo, Erie Co.
Hudson, George, Stillwater, Saratoga Co.
Huestis, W. B., Kiskatom, Greene Co.
Huggins, William Q., Sanborn, Niagara Co.
Hughes, Henry R., Clinton, Oneida Co.
Hughes, Peter, 275 Berry St., Brooklyn, Kings Co.
Hühne, August, Rondout, Ulster Co. Founder.
Hühne, Frederick, Rondout, Ulster Co. Original.
Hull, William H., Poestenkill, Rensselaer Co.
Hulse, William A., Bay Shore, Suffolk Co.
Hunt, H. L., Orchard Park, Erie Co.
Hunt, James G., 5 Gardner Block, Utica, Oneida Co. Original.
Hunt, James H., Port Jervis, Orange Co. Original.
Hunter, Nathaniel P., Jasper, Steuben Co.
Huntington, Henry K., New Rochelle, Westchester Co. Original.
Huntington, John W., Mexico, Oswego Co.
Husted, Nathaniel C., Tarrytown, Westchester Co. Founder.
Ilgen, Ernest, 369 Herkimer St., Brooklyn, Kings Co. Original.
Ingraham, Charles W., Binghamton, Broome Co.
Ingraham, Henry D., 405 Franklin St., Buffalo, Erie Co.
Ingraham, Samuel, Palmyra, Wayne Co. Original. (Retired list.)
Inlay, Erwin G., Saratoga Springs, Saratoga Co.
Jackson, Albert P., Oakfield, Genesee Co. Founder.
Jackson, William H., Springville, Erie Co.
Jacobson, Nathan, 114 S. Salina St., Syracuse, Onondaga Co. Original.
Jamison, John S., Hornellsville, Steuben Co. Original.
Janeway, Edward G., 36 W. 40th St., New York, New York Co. Founder.
Janvrin, J. E., 191 Madison Ave., New York, New York Co.
Jenkins, John A., 150 Milton St., Brooklyn, E. D., Kings Co. Original.
Jenkins, William T., 109 E. 26th St., New York, New York Co.
Jewett, F. A., 282 Hancock St., Brooklyn, Kings Co.
Jewett, Homer O., Cortland, Cortland Co. Founder.
Johnson, George P., Mexico, Oswego Co.

Johnson, Ianthus G., Greenfield Centre, Saratoga Co. Original.
Johnson, Leonard M., Greene, Chenango Co. Original.
Johnson, Parley H., Adams, Jefferson Co. Original.
Johnson, Richard G., Amsterdam, Montgomery Co. Original.
Johnson, Thomas M., 309 Main St., Buffalo, Erie Co. Original.
Johnston, Francis U., New Brighton, Richmond Co. Founder.
Johnston, N. B., Barryville, Sullivan Co.
Jones, George H., Fowlerville, Livingston Co.
Jones, S. Case, 39 N. Fitzhugh St., Rochester, Monroe Co.
Joslin, Albert A., Martinsburgh, Lewis Co.
Julian, John M., Moore's Mill, Dutchess Co.
Keefer, Charles W., Mechanicsville, Saratoga Co.
Keith, Halbert Lyon, Upton, Mass.
Kelly, John Devin, Lowville, Lewis Co.
Kenyon, Benjamin, Cincinnatus, Cortland Co.
Kenyon, M., King's Ferry, Cayuga Co. Original.
Kessler, Adolph, 644 Lexington Ave., New York, New York Co.
Kilborn, Henry F., Croghan, Lewis Co.
King, Ferdinand, 21 Platt St., New York, New York Co.
Kingsley, Henry F., Schoharie, Schoharie Co. Original.
Kinyoun, Joseph J., Stapleton, Richmond Co.
Kittredge, Charles S., Fishkill-on-Hudson, Dutchess Co. Founder.
Klock, Charles M., St. Johnsville, Montgomery Co.
*Knapp, Edwin A., 629 Montgomery St., Syracuse, Onondaga Co. Original.
Knapp, W. H., Binghamton, Broome Co.
Kneeland, B. T., Dalton, Livingston Co.
Kneeland, Jonathan S., Onondaga, Onondaga Co. Founder. (Retired list.)
Kneer, F. G., 236 W. 51st St., New York, New York Co.
Knipe, George, 354 W. 24th St., New York Co.
Kniskern, A. C., Mechanicsville, Saratoga Co.
Kuhn, William, Rome, Oneida Co.
LaBell, Martin J., Lewis, Essex Co. Original.
Laird, William R., 98 Wall St., Auburn, Cayuga Co. Original.
Lake, Albert D., Perrysburgh, Cattaraugus Co.
Lamb, Milton M., Lansingburgh, Rensselaer Co.
Lambert, John, Salem, Washington Co.
*Lamont, John C., Sodus, Wayne Co.
Landon, Newell E., Newark, Wayne Co. Original.
Lapp, Henry, Clarence, Erie Co.
Leach, H. M., Glen, Montgomery Co. Original.
Leale, Charles A., 604 Madison Ave., New York, New York Co. Founder.
Leaning, John K., Cooperstown, Otsego Co. Founder.

*Deceased.

Leighton, N. W., 143 Taylor St., Brooklyn, E. D., Kings Co. Original.
Le Roy, Irving D., Pleasant Valley, Dutchess Co. Founder.
Lester, Elias, Seneca Falls, Seneca Co. Founder.
Lewis, Robert, 449 E. 118th St., New York, New York Co.
Lindsay, Wallie, Huntington, Suffolk Co. Original.
Little, Frank, 114 Montague St., Brooklyn, Kings Co.
Lloyd, T. Mortimer, 125 Pierrepont St., Brooklyn, Kings Co. Original.
Lockwood, Charles E., 63 W. 36th St., New York, New York Co.
Lockwood, J. W., Philmont, Columbia Co. Original.
Long, Alfred J., Whitehall, Washington Co.
Long, Ben G., 1408 Main St., Buffalo, Erie Co.
Ludlow, Ogden C., 210 W. 135th St., New York, New York Co.
Lukens, Anna, 1068 Lexington Ave., New York, New York Co.
Lung, Jesse B., 382 Marion St., Brooklyn, Kings Co. Original.
Lusk, William T., 47 E. 34th St., New York, New York Co. Founder.
Lusk, Zera J., Warsaw, Wyoming Co.
Lyman, Elijah S., Sherburne, Chenango Co. Original.
Lyman, H. C., Sherburne, Chenango Co. Original.
Lynch, Patrick J., 216 E. 13th St., New York, New York Co.
Lyon, E. M., Plattsburgh, Clinton Co. Founder.
Lyon, George E., 1915 5th Ave., Troy, Rensselaer Co. Original.
Lyons, Edward L., 298 4th St., Troy, Rensselaer Co.
Lyons, G. A., New Rochelle, Westchester Co. Original.
Macfarlane, William A., Springville, Erie Co.
MacGregor, James R., 1037 Madison Ave., New York, New York Co.
Mackenzie, J. C., 432 W. 22d St., New York, New York Co.
Magee, Charles M., 201 Seymour St., Syracuse, Onondaga Co.
Magee, Daniel, 116 3d St., Troy, Rensselaer Co. Original.
Maine, Alvah P., Webster, Monroe Co.
Manley, Thomas H., 302 W. 53d St., New York, New York Co. Founder.
Marsh, E. Frank, Fulton, Oswego Co.
Marsh, James P., 1739 5th Ave., Troy, Rensselaer Co.
Marshall, Francis F., 56 W. 56th St., New York, New York Co.
Martin, John H., Otego, Otsego Co. Original.
Martindale, F. E., Port Richmond, Richmond Co.
Martine, Godfrey R., Glens Falls, Warren Co. Original.
Matthews, David, 73 E. 54th St., New York, New York Co.
Maury, Rutson, 252 Madison Ave., New York, New York Co.
McBurney, Charles, 40 W. 36th St., New York, New York Co.
McCollom, William, 195 Lefferts Place, Brooklyn, Kings Co. Original.
McDonald, George E., Schenectady, Schenectady Co. Original.
McDougall, R. A., Duanesburgh, Schenectady Co.
McDougall, William D., Spencerport, Monroe Co. (San José, Cal.)
McEwen, Robert C., Saratoga Springs, Saratoga Co. Founder.

McGann, Thomas, Wells, Hamilton Co.
McGillicuddy, T. J., 125 E. 83d St., New York, New York Co.
McGowen, John P., 137 E. 28th St., New York, New York Co.
McIlroy, Samuel H., 330 Alexander Ave., New York, New York Co.
McLeod, Johnston, 247 W. 23d St, New York, New York Co.
McLeod, S. B. Wylie, 247 W. 23d St., New York, New York Co. Founder.
McLochlin, James A., 203 7th Ave., New York, New York Co. Original.
McNamara, Daniel, 243 W. Genesee St., Syracuse, Onondaga Co. Original.
McNamara, Laurence J., 126 Washington Place (West), New York, New York Co. Original.
McPherson, George W., Lancaster, Erie Co.
*McTammany, George H., Washington Park, Troy, Rensselaer Co.
McWilliams, F. A., Monticello, Sullivan Co.
Meacham, Isaac D., Binghamton, Broome Co.
Meier, Gotlieb C. H., 210 E. 53d St., New York, New York Co.
Menzie, R. J., Caledonia, Livingston Co. Original.
Merritt, George, Cherry Valley, Otsego Co. Original.
Miller, William T., 310 W. 27th St., New York, New York Co. Original.
Milliken, S. E., 157 Madison Ave., New York, New York Co.
Minard, E. J. Chapin, 243 Quincy St., Brooklyn, Kings Co. Original.
Miranda, Ramon L., 54 W. 37th St., New York, New York Co. Original.
Mitchell, Howard E., 84 4th St., Troy, Rensselaer Co. Founder.
Mitchell, Hubbard W., 747 Madison Ave., New York, New York Co. Original.
Moore, Edward M., 74 S. Fitzhugh St., Rochester, Monroe Co. Founder.
Moore, Edward M., Jr., 74 S. Fitzhugh St., Rochester, Monroe Co. Original.
Moore, Richard Mott, 74 S. Fitzhugh St., Rochester, Monroe Co. Original.
Moore, William A., Binghamton, Broome Co.
Moran, James, 338 W. 51st St., New York, New York Co.
Moriarta, Douglas C., Saratoga Springs, Saratoga Co.
Morrow, William B., Walton, Delaware Co.
Mott, Valentine, 62 Madison Ave., New York, New York Co.
Moyer, Frank H., Moscow, Livingston Co. Original.
Mudge, Selden J., Olean, Cattaraugus Co.
Munger, Charles, Knoxborough, Oneida Co.
Munson, J. A., Woodbourne, Sullivan Co. Original.
Munson, W. W., Otisco, Onondaga Co. Original.
Murdock, George W., Cold Spring, Putnam Co. Founder.
Murphy, John, 219 E. 37th St., New York, New York Co. Original.
Murray, Byron J., Saratoga Springs, Saratoga Co. Original.

*Deceased.

Murray, S. J., 133 W. 87th St., New York, New York Co. Original.
Murray, William D., Tonawanda, Erie Co. Original.
Nelson, William H., Taberg, Oneida Co.
Newman, Robert, 68 W. 36th St., New York, New York Co. Original.
Nichols, Calvin E., 25 First St., Troy, Rensselaer Co. Founder.
Nichols, H. W., Canandaigua, Ontario Co. Founder.
Nichols, William H., West Sand Lake, Rensselaer Co. Founder.
Nicholson, A. R., Madison, Madison Co. Original.
Nicoll, Henry D., 51 E. 57th St., New York, New York Co. Founder.
Nold, John B., 165 North Ave., Rochester, Monroe Co.
North, Nelson L., 627 Bedford Ave., Brooklyn, Kings Co. Original.
Nutten, Wilbur F., Newark, Wayne Co.
Oberndorfer, Isidor P., 160 E. 63d St., New York, New York Co. Original.
O'Brien, Frederick Wm., 234 E. 112th St., New York, New York Co.
Ochs, Benjamin F., 773 Lexington Ave., New York, New York Co.
O'Hare, Thomas A., 157 State St., Rochester, Monroe Co. Original.
Oliver, William, Penn Yan, Yates Co.
Oppenheimer, H. S., 49 E. 23d St., New York, New York Co.
Orton, John G., Binghamton, Broome Co. Founder.
Ostrander, George A., 61 Greene Ave., Brooklyn, Kings Co.
Packer, Thurston G., Smyrna, Chenango Co.
Paine, Arthur R., 99 Lafayette Ave., Brooklyn, Kings Co. Original.
Palmer, Edmund J., 1342 Lexington Ave., New York, New York Co.
Palmer, F. A., Mechanicsville, Saratoga Co.
Palmer, George M., Warsaw, Wyoming Co. Original.
Palmer, Henry C., cor. Genesee and Hopper Sts., Utica, Oneida Co.
Palmer, Walter B., 30 South St., Utica, Oneida Co.
Park, Roswell, 305 Delaware Ave., Buffalo, Erie Co.
Parr, John, Buel, Montgomery Co.
Parsons, Israel, Marcellus, Onondaga Co. Founder.
Parsons, John, Bailey Ave., near Kingsbridge Road, New York, New York Co. Original.
Parsons, W. W. D., Fultonville, Montgomery Co.
Pease, Joseph, Hamlin, Monroe Co. Original.
Perry, John Gardner, 48 E. 34th St., New York, New York Co.
Perry, Nathaniel M., Troupsburgh, Steuben Co. Original.
Peters, Samuel, 86 Mohawk St., Cohoes, Albany Co. Founder.
Pettit, John A., 519 Swan St., Buffalo, Erie Co. Original.
Phelps, Charles, 34 W. 37th St., New York, New York Co.
Phelan, Michael F., 339 Congress St., Troy, Rensselaer Co.
Phelps, George G., 239 Blandina St., Utica, Oneida Co.
Phelps, William C., 146 Allen St., Buffalo, Erie Co.
Pierce, Edward A., Binghamton, Broome Co.

Pierson, George E., Kirkwood, Broome Co.
Pilgrim, Charles W., State Hospital, Utica, Oneida Co. Original.
Piper, Charles W., Wurtsborough, Sullivan Co.
Place, John F., Jr., Binghamton, Broome Co.
Pohlman, Julius, 539 Niagara St., Buffalo, Erie Co.
Pollard, Abiathar, Westport, Essex Co. Original. (Retired list.)
Pooler, Hiram A., 34 Gramercy Park, New York, New York Co. Original.
Porteous, James G., Poughkeepsie, Dutchess Co. Founder.
Porter, Harry N., 1910 Harewood Ave., Washington, D. C. Founder. (Retired list.)
Porter, P. Brynberg, 8 W. 35th St., New York, New York Co. Original.
Potter, Vaughn C., Starkville, Herkimer Co. Original.
Potts, E., Port Jervis, Orange Co.
Pray, S. R., 523 Bedford Ave., Brooklyn, Kings Co. Original.
Preston, John R., Schuylerville, Saratoga Co. Original.
Preston, B. I., 31 Chestnut St., Rochester, Monroe Co.
Price, Henry R., 485 Franklin Ave., Brooklyn, Kings Co.
Pritchard, R. L., 75 W. 45th St., New York, New York Co.
Pultz, Monroe T., Stanfordville, Dutchess Co. Founder.
Purple, Samuel S., 36 W. 22d St., New York, New York Co. Founder.
Putnam, Frederick W., Binghamton, Broome Co. Founder.
Putnam, James W., 130 Pearl St., Buffalo, Erie Co. Original.
Quin, Hamilton S., 171 Genesee St., Utica, Oneida Co.
Race, W. F., 115 W. 25th St., Kearney, Nebraska. Original.
Rae, Robert, Portageville, Wyoming Co. Original.
Rand, Hannibal W., Keene, Essex Co. Original.
Ransom, H. B. (in care S. V. White & Co.), 36 Wall St., New York, New York Co.
Rave, Edward G., Hicksville, Queens Co. Original.
Read, Ira B., 66 E. 126th St., New York, New York Co.
Reagles, James, Schenectady, Schenectady Co. Original.
Reed, Henry B., 12 Vernon Place, Brooklyn, Kings Co.
Reid, Christopher C., Rome, Oneida Co.
Reynolds, Tabor B., Saratoga Springs, Saratoga Co. Founder.
Rice, George, Mechanicsville, Saratoga Co.
Rice, Isaac, Bloomingdale, Essex Co. Original.
Richards, Charles B., Binghamton, Broome Co. Founder.
Richmond, Nelson G., Fredonia, Chautauqua Co.
Ricketts, Benjamin M., 137 Broadway, Cincinnati, Ohio. Original.
Riley, Andrew W., 207 S. 16th St., Omaha, Neb. Original.
Risch, Henry F. W., 208 17th St., Brooklyn, Kings Co.
Robb, William H., Amsterdam, Montgomery Co. Founder.
Robinson, Ezra A., Geneva, De Kalb Co., Ill. Original.

Rochester, Thomas M., 2 St. James Place, Brooklyn, Kings Co.
Rodgers, Harris C., Binghamton State Hospital, Binghamton, Broome Co.
Rogers, S. Frank, 3161 6th Ave., Troy, Rensselaer Co. Original.
Rolph, R. T., Dunkirk, Chautauqua Co.
Roper, P. B., Alpine, Schuyler Co.
Ross, Frank W., 251 Baldwin St., Elmira, Chemung Co. Original.
Roth, Julius A., 308 E. 79th St., New York, New York Co.
Rousseau, Zotique, 99 2d St., Troy, Rensselaer Co. Founder.
Rudgers, Denton W., Perry, Wyoming Co.
Ruggles, Augustus D., 239 W. 14th St., New York, New York Co.
Rulison, Elbert T., Amsterdam, Montgomery Co. Original.
Rulison, L. B., West Troy, Albany Co.
Rushmore, John D., 129 Montague St., Brooklyn, Kings Co. Founder.
Russell, Charles P., 198 Genesee St., Utica, Oneida Co.
Russell, William G., 27 McDonough St., Brooklyn, Kings Co. Original.
Sabin, William B., 1425 Broadway, West Troy, Albany Co. Founder.
Sabine, Gustavus A., 8 E. 24th St., New York, New York Co. Original.
Sanders, E., 126 E. 82d St., New York, New York Co.
Sawyer, Conant, Auburn, Cayuga Co. Founder.
Saxer, Leonard A., 514 Prospect Ave., Syracuse, Onondaga Co. Original.
Sayre, Lewis A., 285 Fifth Ave., New York, New York Co. Founder.
Sayre, Reginald H., 285 Fifth Ave., New York, New York Co.
Schmid, H. Ernest, White Plains, Westchester Co. Original.
Seaman, Frank G., Seneca Falls, Seneca Co.
Sears, F. W., 326 Montgomery St., Syracuse, Onondaga Co.
Segur, Avery, 281 Henry St., Brooklyn, Kings Co. Founder.
Selden, O. G., Catskill, Greene Co. Original.
Selden, Robert, Catskill, Greene Co. Original.
Seymour, Ralph A., Whitney's Point, Broome Co.
Seymour, W. Wotkyns, 105 3d St., Troy, Rensselaer Co. Founder.
Sharer, John P., Little Falls, Herkimer Co. Original.
Shaw, Henry B., 21 E. 127th St., New York, New York Co.
Shepard, A. Warner, 126 Willoughby St., Brooklyn, Kings Co. Original.
Sherer, John D., Waterford, Saratoga Co. Original.
Sherman, F. J., Ballston, Saratoga Co.
Shrady, John, 149 W. 126th St., New York, New York Co.
Shunk, Albert, 341 W. 23d St., New York, New York Co.
Silver, Henry M., 39 7th St., New York, New York Co.
Simmons, E. W., Canandaigua, Ontario Co. Founder.
Simons, Frank E., Canajoharie, Montgomery Co.
Sizer, Nelson Buell de S., 336 Greene Ave., Brooklyn, Kings Co. Original.
Skinner, Smith A., Hoosick Falls, Rensselaer Co. Original.

Slater, Frank Ellsworth, Binghamton, Broome Co.
Small, John W., 6826 Wentworth Ave., Chicago, Ill.
Smeallie, James A., 12 W. 40th St., New York, New York Co.
Smelzer, Baxter T., Havana, Schuyler Co.
*Smith, David M., Penn Yan, Yates Co.
Smith, George C., Delhi, Delaware Co.
Smith, H. Lyle, Hudson, Columbia Co. Original.
Smith, J. Lewis, 64 W. 56th St., New York, New York Co. Original.
*Smith, Joseph T., Canandaigua, Ontario Co. Founder.
*Smith, Marcellus R., Cincinnatus, Cortland Co. Original.
Smith, Samuel L., Smithville Flats, Chenango Co.
Smith, Samuel W., 24 W. 30th St., New York, New York Co. Original.
Smith, Stephen, 574 Madison Ave., New York, New York Co. Original.
Smyth, Arthur V. H., Minaville, Montgomery Co.
Snook, George, Parma, Monroe Co.
Southworth, Malek A., Little Falls, Herkimer Co. Original.
Southworth, Richmond Joseph, 1220 36th St., N. W., Washington, D. C. Original.
Spicer, Walter E., 41 N. Moore St., New York, New York Co.
Sprague, John A., Williamson, Wayne Co. Original.
Sprague, L. S., Williamson, Wayne Co. (Retired list.)
*Sprague, William B., Pavilion, Genesee Co. Founder.
Squibb, Edward H., 148 Columbia Heights, Brooklyn, Kings Co. Founder.
Squibb, Edward R., 152 Columbia Heights, Brooklyn, Kings Co. Founder.
Squire, Charles L., 409 E. Church St., Elmira, Chemung Co.
*Steinführer, Gustavus A. F., Schenectady, Schenectady Co.
Steinke, Carl Otho Hermann, 220 17th St., Brooklyn, Kings Co. Original.
Stephenson, F. Halleck, 101 Warren St., Syracuse, Onondaga Co.
Stephenson, James A., Scio, Allegany Co. Original.
Stockschlaeder, P., 186 South Ave., Rochester, Monroe Co.
Stockton, Charles G., 436 Franklin St., Buffalo, Erie Co.
Stone, Frank L., Le Roy, Genesee Co.
Strong, Orville C., Colden, Erie Co.
Strong, Thomas D., Westfield, Chautauqua Co. Founder.
Stubbs, Roland H., Waterford, Saratoga Co. Original.
Sullivan, John D., 74 McDonough St., Brooklyn, Kings Co.
Sutton, H. C., Rome, Oneida Co.
Sutton, Richard E., Rome, Oneida Co.
Swartwout, H. B., Port Jervis, Orange Co.
Swartwout, Leander, Prospect, Oneida Co.
Sweet, Joseph J., Unadilla, Otsego Co. Original.

* Deceased.

Sweet, Joshua J., Unadilla, Otsego Co.
Sweetman, J. T., Jr., Ballston, Saratoga Co.
Taber, R. C., Tonawanda, Erie Co.
Taylor, John H., Holley, Orleans Co. Original.
Tefft, Charles B., 8 Henry St., Utica, Oneida Co.
Thayer, William Henry, 171 Livingston St., Brooklyn, Kings Co. Original.
Thomas, T. Gaillard, 600 Madison Ave., New York, New York Co. Founder.
Thompson, R. A., Norwich, Chenango Co.
Thornton, William H., 570 Niagara St., Buffalo, Erie Co.
Thwing, Clarence, Sitka, Alaska.
Tiemann, Paul E., 110 W. 104th St., New York, New York Co.
Todd, John B., Parish, Oswego Co.
Tompkins, Fred J., 128 2d Ave., Lansingburgh, Rensselaer Co.
Tompkins, H. C., Knowlesville, Orleans Co. Founder.
Tompkins, Orren A., East Randolph, Cattaraugus Co. Original.
Townsend, Morris W., Bergen, Genesee Co. Founder.
Traver, Richard D., 14 4th St., Troy, Rensselaer Co. Original.
Travis, Edward M., Masonville, Delaware Co.
Tremaine, Wm. S., 217 Franklin St., Buffalo, Erie Co. Founder.
Tripp, John D., Auburn, Cayuga Co. Original.
Truax, J. G., 17 E. 127th St., New York, New York Co.
Trull, H. P., Williamsville, Erie Co.
Tucker, Carlos P., 43 W. 26th St., New York, New York Co. Founder.
Turner, Melvin H., Hammondsville, Essex Co. Original.
Twohey, John J., 170 E. Utica St., Buffalo, Erie Co.
Vanderhoof, Frederick D., Phelps, Ontario Co. Original.
Vanderveer, J. R., 301 Carlton Ave., Brooklyn, Kings Co.
Van de Warker, Ely, 104 Fayette Park, Syracuse, Onondaga Co. Founder.
*Van Dusen, Melvin E., Hornellsville, Steuben Co.
Van Fleet, Frank, 158 E. 81st St., New York, New York Co.
Van Hoevenberg, Henry, Kingston, Ulster Co. Original.
Van Vranken, Adam T., 1603 3d Ave., West Troy, Albany Co. Original.
Van Wagner, L. A., Sherburne, Chenango Co.
Van Wyck, Richard C., Hopewell Junction, Dutchess Co. Original.
Van Zandt, Henry C., Schenectady, Schenectady Co. Original.
*Vaughn, Frank O., 249 Swan St., Buffalo, Erie Co. Original.
Vedder, George W., Philmont, Columbia Co.
Vincent, Ludger C., 52 W. 26th St., New York, New York Co.
Wagner, Charles Gray, State Hospital, Utica, Oneida Co.
Wakeley, Benjamin C., Angelica, Allegany Co. Original.

* Deceased.

Wales, Theron A., Elmira, Chemung Co. Original.
Wallace, Edwin E., Jasper, Steuben Co.
Wallach, Joseph G., 159 E. 62d St., New York, New York Co. Original.
Walser, William C., Port Richmond, Richmond Co.
Walsh, Simon J., 9 E. 129th St., New York, New York Co.
Ward, Charles S., 30 W. 33d St., New York, New York Co. Founder.
Ward, John J., Ellenville, Ulster Co.
Ward, R. H., 53 4th St., Troy, Rensselaer Co.
Warner, Frederic M., 66 W. 65th St., New York, New York Co.
Warner, John W., 107 E. 72d St., New York, New York Co.
Waterworth, William, 493 Franklin Ave., Brooklyn, Kings Co.
Webster, W. B., Schuylerville, Saratoga Co.
Welles, S. R., Waterloo, Seneca Co.
Wells, E. H., Binghamton, Broome Co.
Wells, William L., New Rochelle, Westchester Co. Original.
West, Joseph E., 171 Genesee St., Utica, Oneida Co.
West, M. Calvin, Rome, Oneida Co.
Weston, Albert T., 226 Central Park West, bet. 82d and 83d Sts., New York, New York Co.
Wheeler, Isaac G., Marilla, Erie Co.
Wheeler, John T., Chatham, Columbia Co.
White, Charles B., 107 W. 72d St., New York, New York Co.
White, J. Blake, 1013 Madison Ave., New York, New York Co.
White, Whitman V., 1024 Park Ave., New York, New York Co. Founder.
White, William T., 130 E. 30th St., New York, New York Co. Founder.
Whitford, James, Onondaga Valley, Onondaga Co. Original.
Wieber, George, 181 S. 5th St., Brooklyn, Kings Co. Original.
Wiener, Joseph, 150 E. 61st St., New York, New York Co. Founder.
Williams, George O., Greene, Chenango Co.
Williams, William H., 207 17th St., Brooklyn, Kings Co. Original.
*Willis, A. B., Schenectady, Schenectady Co.
Willoughby, M., 1335 Main St., Buffalo, Erie Co.
Williamson, Edward A., Westchester Road, Westchester Co.
Wilson, Thomas, Claverack, Columbia Co. Founder.
Witbeck, Charles E., Cohoes, Albany Co.
Woodend, William D., Huntington, Suffolk Co. Founder.
Woodend, William E., 171 E. 116th St., New York, New York Co.
Woodruff, R. Allen, Philmont, Columbia Co.
Woodworth, T. Floyd, Kinderhook, Columbia Co.
Wyckoff, Cornelius C., 482 Delaware St., Buffalo, Erie Co. Founder.
Wyckoff, Richard M., 532 Clinton Ave., Brooklyn, Kings Co. Founder.
Wyeth, John A., 267 Madison Ave., New York, New York Co. Original.
Young, Augustus A., Newark, Wayne Co. Original.

*Deceased.

Young, John, Fishkill-on-Hudson, Dutchess Co. Original.
Young, John D., Starkville, Herkimer Co. Original.
Young, William, Cold Spring, Putman Co. Founder. (Retired list.)
Zeh, Edgar, Waterford, Saratoga Co.
Zeh, Merlin J., 1521 Broadway, West Troy, Albany Co.

Of 164 Founders, 120 remain on the list; of 286 Original Fellows, 235 remain on the list. Total Fellowship, 740.

RETIRED FELLOWS.

Charles G. Bacon, Fulton, Oswego County (1891).
M. M. Bagg, Utica, Oneida County (1891).
Lyman Barton, Willsborough, Essex County (1890).
F. R. Bentley, Cheshire, Ontario County (1891).
William N. Bonesteel, Troy, Rensselaer County (1890).
Alonzo Churchill, Utica, Oneida County (1890).
C. L. Dayton, Buffalo, Erie County (1891).
James Ferguson, Glens Falls, Warren County (1891).
Philip DuB. HoornBeek, Wawarsing, Ulster County (1891).
Samuel Ingraham, Palmyra, Wayne County (1890).
Jonathan S. Kneeland, Onondaga County (1890).
Abiathar Pollard, Westport, Essex County (1890).
H. N. Porter, Washington, D. C. (1891).
L. S. Sprague, Williamson, Wayne County (1891).
William Young, Cold Spring, Putnam County (1891).

HONORARY FELLOWS.

Sir John Simon, 40 Kensington Square, London, England (1890).

CORRESPONDING FELLOWS.

William Goodell, M. D., 1418 Spruce St., Philadelphia, Pa. (1890).
Henry O. Marcy, M. D., 116 Bolyston St., Boston Mass. (1890).

* Deceased.

DECEASED FELLOWS.

DECEASED FELLOWS.

Name.	Age.	County.	Place of Birth.	Date of Death.	Medical College.	Year of Graduation.
Adams, John G. (F)[1]	77	New York	New York city	June 19, 1884.	Coll. Phys. and Surg., N. Y.	1830
Andrews, John S. (O)[2]	61	Kings	Bristol, Conn.	Jan. 3, 1889.	Univ. City of New York	1849
Ashton, Isaiah H.	39	Westchester	Philadelphia, Pa.	Feb. 16, 1889.	University of Pennsylvania	1870
Avery, George W. (F)	61	Chenango	Earlville, N. Y.	Nov. 1, 1888.	Albany Medical College	1850
Ayres, Alexander (F)	74	Montgomery	Oppenheim, N. Y.	Aug. 27, 1886.	Castleton, Vt.	1842
Barker, A. M. (O)	37	Erie	Kendall, Orleans Co., N. Y.	Dec. 6, 1887.	University of Buffalo	1877
Bathgate, James (O)	65	New York	New York	March 27, 1891.	Coll. Phys. and Surg., N. Y.	1846
Bemus, William P.	63	Chautauqua	Chautauqua Co.	Sept. 19, 1890.	Berkshire Medical College	1847
Blakeman, William N. (O).	85	New York	Roxbury, Conn.	Aug. 10, 1890.	Yale	1832
Bucklin, Daniel D. (O)	70	Rensselaer	Brunswick, N. Y.	April 19, 1890.	Albany Medical College	1846
Budd, J. Henry (O)	45	Ontario	United States	Feb. 25, 1890.	Buffalo Medical College	1875
Case, Mary W.	33	Rensselaer	New York state	Aug. 19, 1889.	Woman's Med. Coll., Phila.	1882
Church, Allen S. (F)	62	New York	Great Barrington, Mass.	Oct. 24, 1884.	Castleton, Vt.	1848
Clark, Alonzo	80	New York	Chester, Mass.	Sept. 13, 1887.	Coll. Phys. and Surg., N. Y.	1835
Coit, William N. (F).	52	Clinton	Plattsburgh, N. Y.	Aug. 4, 1886.	University of Pennsylvania	1856
Collins, Isaac G. (F)	53	Westchester	Granville, N. Y.	Dec. 18, 1885.	Albany Medical College	1858
Collins, Thomas B. (O)	61	Monroe	Mendon, N. Y.	Feb. 17, 1888.	Jefferson Med. Coll., Phila.	1851
Cooper, William S. (F)	70	Rensselaer	Scotland	May 26, 1890.	Albany Medical College	1860
Cornell, F. O. (O)	29	Montgomery	Glenville, N. Y.	Dec. 3, 1884.	Albany Medical College	1880
Cotes, J. R.	54	Genesee	Batavia, N. Y.	March 20, 1884.	Med. Dep. Univ., Buffalo	1852
Cruttenden, Albert G.	75	Ontario	Covington, N. Y.	June 7, 1890.	Willoughby Univ., Ohio	1840

[1] (F) Founder. [2] (O) Original Fellow.

Davidson, John (F) . . .	91	Queens . . .	New York city	Dec. 26, 1884.	Lic. N. Y. St. Med. Soc. . .	1829
De La Mater, S. G. (F) . .	73	Schenectady .	Bethlehem, Alb. Co., N. Y.	June 23, 1888.	Albany Medical College . .	1842
Du Bois, Abram (F) . . .	81	New York . .	Red Hook, N. Y.	Aug. 29, 1891.	Coll. Phys. and Surg., N. Y. .	1835
Eager, William B. (O) . .	65	Orange . . .	Orange Co.	Jan. 18, 1890.	Coll. Phys. and Surg., N. Y. .	1848
Earll, George W. (F) . .	53	Onondaga . .	Mottville, N. Y.	July 8, 1890.	Buffalo Medical College . .	1858
Edgerly, Edward F. (F) .	50	Essex . . .	Moriah, Essex Co. . . .	June 23, 1889.	Albany Medical College . .	1864
Elder, Jennie S.	32	Onondaga . .	Syracuse, N. Y.	Feb. 2, 1889.	Med. Dept. Syracuse Univ. .	1878
Flint, Austin (F)	73	New York . .	Petersham, Mass. . . .	March 13, 1886.	Harvard Medical College . .	1833
Flood, Patrick Henry (O) .	72	Chemung . .	Pennsylvania	March 12, 1886.	Geneva Medical College. . .	1845
Fox, Eli	57	Herkimer . .	Columbia, N. Y. . . .	Oct. 13, 1890.	Med. Dept. Univ. City of N. Y.	1855
Fuller, Winfield S. (O) . .	48	Monroe . . .	Walworth, N. Y. . . .	Jan. 13, 1888.	Coll. Phys. and Surg., N. Y. .	1861
Garrish, John P. (O) . .	76	New York . .	New Brunswick, N. J. .	April 1, 1891.	Jefferson Med. Coll., Phila. .	1836
Gay, Charles C. F. (F) . .	66	Erie	Pittsfield, Mass.	March 27, 1886.	Berkshire Medical College. .	1846
Gray, John Perdue (F) . .	61	Oneida . . .	Half Moon, Pa.	Nov. 29, 1886.	University of Pennsylvania .	1849
Gray, John W. (F) . . .	53	Livingston. .	America	April 17, 1886.	University of New York . .	1856
Griswold, Gaspar (O) . .	29	New York . .	New York city	March 4, 1886.	Bellevue Hospital Med. Coll. .	1878
Guernsey, Desault (F) . .	55	Dutchess . .	Wilton, N. Y.	Dec. 9, 1885.	Coll. Phys. and Surg., N. Y. .	1850
Hall, H. C. (O)	41	Broome . . .	America	June 1, 1887.	Univ. of New York Med. Coll.	1869
Hall, John E. (O)	38	Albany . . .	New Marlboro', Mass. .	Nov. 3, 1886.	Albany Medical College . .	1877
Hamilton, Frank H. (F) .	73	New York . .	Wilmington, Vt. . . .	Aug. 11, 1886.	University of Pennsylvania .	1835
Higgins, Seabury M. (O) .	67	Onondaga . .	Brewster, Mass.	Dec. 9, 1889.	University City of New York.	1848
Hinds, Frederic J. (O) . .	32	Washington .	East Greenwich, N. Y. .	April 26, 1887.	Bellevue Hospital Med. Coll. .	1876
Hollister, Edwin O. (O). .	41	Ontario . . .	Batavia, N. Y.	Oct. 8, 1887.	Bellevue Hospital Med. Coll. .	1874
Hutchison, Joseph C. (F) .	60	Kings . . .	Old Franklin, Mo. . . .	July 17, 1887.	University of Pennsylvania. .	1848
Hyde, Frederick (F) . . .	80	Cortland . .	Whitney Point, N. Y. . .	Oct. 15, 1887.	Fairfield Medical College . .	1836
King, James E. (O) . . .	66	Erie	Warren, Pa.	Jan. 21, 1888.	Buffalo Medical College . .	1848

DECEASED FELLOWS.—*Concluded.*

Name.	Age.	County.	Place of Birth.	Date of Death.	Medical College.	Year of Graduation.
Knapp, Edwin A. (O)	67	Onondaga	New York state	Dec. 7, 1890.	Geneva Med. Coll.	1851
Knapp, John H. (O)	67	Cortland	New Fairfield, Conn.	April 30, 1886.	Chenango County Med. Soc. Geneva Med. Coll.	1843 1861
Lamont, John Campbell,	47	Wayne	Edinburgh, Scotland	Dec. 13, 1887.	Med. Dept. Univ. City of N. Y.	1862
Lauer, Eugene (O)	40	New York	Germany	Oct. 31, 1886.	Giessen and Marburg	1868
Lester, Sullivan W. (O)	40	Rensselaer	Niantic, Conn.	Jan. 5, 1890.	Med. Dept. Univ. City of N. Y.	1881
Linsly, Jared (F)	84	New York	Northfield, Conn.	July 12, 1887.	Coll. Phys. and Surg., N. Y.	1829
McClellan, Christopher R.	73	Kings	Maryland	Jan. 13, 1887.	University of Maryland	1835
McTammany, George H.	31	Rensselaer	Troy, N. Y.	April 12, 1891.	Albany Medical College	1884
McTammany, Wm. F. (O)	36	Rensselaer	Troy, N. Y.	July 21, 1888.	Bellevue Hospital Med. Coll.	1880
Moore, Joseph W. (F)	47	Albany	Troy, N. Y.	Sept. 9, 1886.	Castleton, Vt.	1859
Morrell, Isaac	79	Chemung	Cornish, Maine	Sept. 8, 1887.	Bowdoin Medical College	1832
Pask, William (O)	55	Erie	England	Aug. 24, 1884.	Med. Dept. Univ. Buffalo	1884
Peck, M. R. (O)	62	Warren	Sand Lake, N. Y.	April 4, 1884.	Albany Medical College	1851
Pomeroy, Charles G. (F)	71	Wayne	New York	Dec. 14, 1887.	Ontario County Med. Soc. Jefferson Medical College	1837 1850
Pryer, Wm. Chardavoyne (F)	54	Westchester	New York city	Sept. 24, 1888.	Coll. Phys. and Surg., N. Y.	1862
Purdy, Isaac (O)	57	Sullivan	Walkill, N. Y.	Dec. 6, 1885.	Castleton, Vt.	1851
Reynolds, Rufus C. (F)	79	Monroe	Columbia, Herkimer Co.	Dec. 22, 1886.	Fairfield Med. College, N. Y.	1830
Ring, William (F)	63	Erie	United States	April 20, 1887.	University of Buffalo	1848
Robinson, Joseph W.	49	Steuben	Angelica, N. Y.	Jan. 4. 1887.	Buffalo Medical College	1862

Rochester, Thomas F. (F) .	63	Erie	Rochester, N. Y. . . .	May 24, 1887.	University of Pennsylvania .	1848
Sabin, Robert Hall (F) . .	56	Albany . . .	Saxton's River, Vt. . .	Dec. 4, 1888.	Albany Medical College . .	1856
Sayre, Lewis Hall (F) . .	38	New York . .	New York city	Jan. 2, 1890.	Bellevue Hospital Med. Coll.	1876
Schoonmaker, E. J. (F) . .	65	Seneca . . .	Ulster Co., N. Y. . . .	Aug. 19, 1889.	Geneva Medical College . .	1848
Skiff, George V. (O) . . .	53	New York . .	Pike, N. Y.	Jan. 28, 1890.	Univ. City of New York . .	1860
Slack, Henry (F)	57	Dutchess . .	Albany, N. Y.	Dec. 10, 1886.	Albany Medical College . .	1852
Slocum, J. O. (F)	65	Onondaga . .	Pompey, N. Y.	Mar. 3, 1885.	Castleton, Vt.	1846
Smith, David M.	35	Yates . . .	New York city	Mar. 19, 1891.	Bellevue Hospital Med. Coll. .	1877
Smith, Joseph T. (F) . .	60	Ontario . . .	Farmington, N. Y. . . .	Dec. 9, 1890.	Jefferson Med. Coll., Phila. .	1854
Smith, Marcellus R. (O) .	74	Cortland . .	Taylor, N. Y.	Dec. 11, 1890.	Geneva Medical College . .	1847
Sprague, William B. (F) .	55	Genesee . .	Pavilion, N. Y.	Mar. 16, 1891.	University of Buffalo . . .	1857
Squire, Truman Hoffman .	66	Chemung . .	Russia, Herkimer Co. .	Nov. 27, 1889.	Coll. Phys. and Surg., N. Y. .	1848
Steele, Charles G.	27	Erie	Buffalo, N. Y.	Feb. 12, 1888.	University of Buffalo . . .	1886
Steinführer, Gustavus A. F.	37	Schenectady .	Germany	July 2, 1890.	Coll. Phys. and Surg., N. Y. .	1874
Stevens, Frederick P. (O) .	31	New York . .	Ithaca, N. Y.	Dec. 4, 1884.	Bellevue Hospital Med. Coll. .	1877
Stevenson, William G. . .	44	Rockland . .	Troy, Ohio	Feb. 3, 1888.	Bellevue Hospital Med. Coll. .	1864
Sutton, George Samuel . .	63	Dutchess . .	Louisville, N. Y. . . .	Sept. 6, 1888.	Coll. Phys. and Surg., N. Y. .	1859
Taylor, Isaac E. (F) . . .	79	New York . .	Philadelphia, Pa. . . .	Oct. 30, 1889.	University of Pennsylvania .	1834
Van Dusen, Melville E. . .	36	Steuben . .	Wheeler, N. Y.	June 15, 1891.	Med. Dept. Univ. Mich. . .	1879
Vaughn, Frank O. (O) . .	44	Erie	Buffalo, N. Y.	Mar. 18, 1891.	Med. Dept. Buffalo Univ. . .	1880
Webb, Edwin (O)	85	Queens . . .	Devonport, England . .	Jan. 29, 1890.	Coll. Phys. and Surg., N. Y. .	1825
White, Francis V	56	New York . .	New York city	Oct. 9, 1889.	Univ. City of New York . .	1855
Willis, A. B.	43	Schenectady .	Coeymans, N. Y. . . .	May 10, 1891.	Albany Medical College . .	1870
Winship, Cornelius A. (O) .	62	Rensselaer . .	Litchfield, Conn. . . .	Feb. 14, 1888.	Albany Medical College . .	1858
Wood, Charles S. (F) . .	65	New York . .	Litchfield, Conn. . . .	Feb. 1, 1890.	Jefferson Med. College, Phila.	1851
Young, Oscar H. (O) . .	43	Delaware . .	Pennsylvania	Jan. 21, 1889.	Jefferson Med. College, Phila.	1876

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